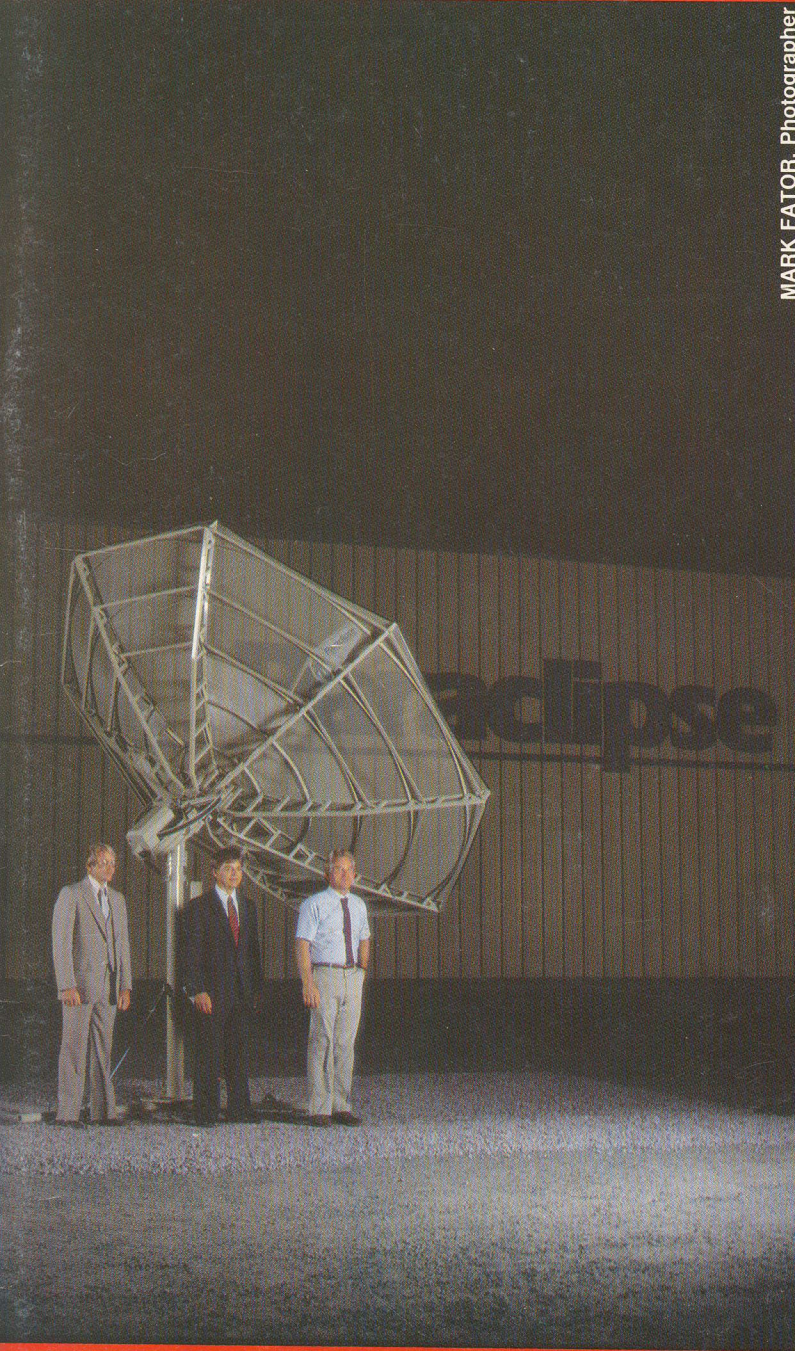


MARK FATOR, Photographer



JIM R. JERNIGAN, Photographer



**COOP'S
SATELLITE
DIGEST**



SEPTEMBER 01, 1985

BATTLE OF THE ANTENNA GIANTS/

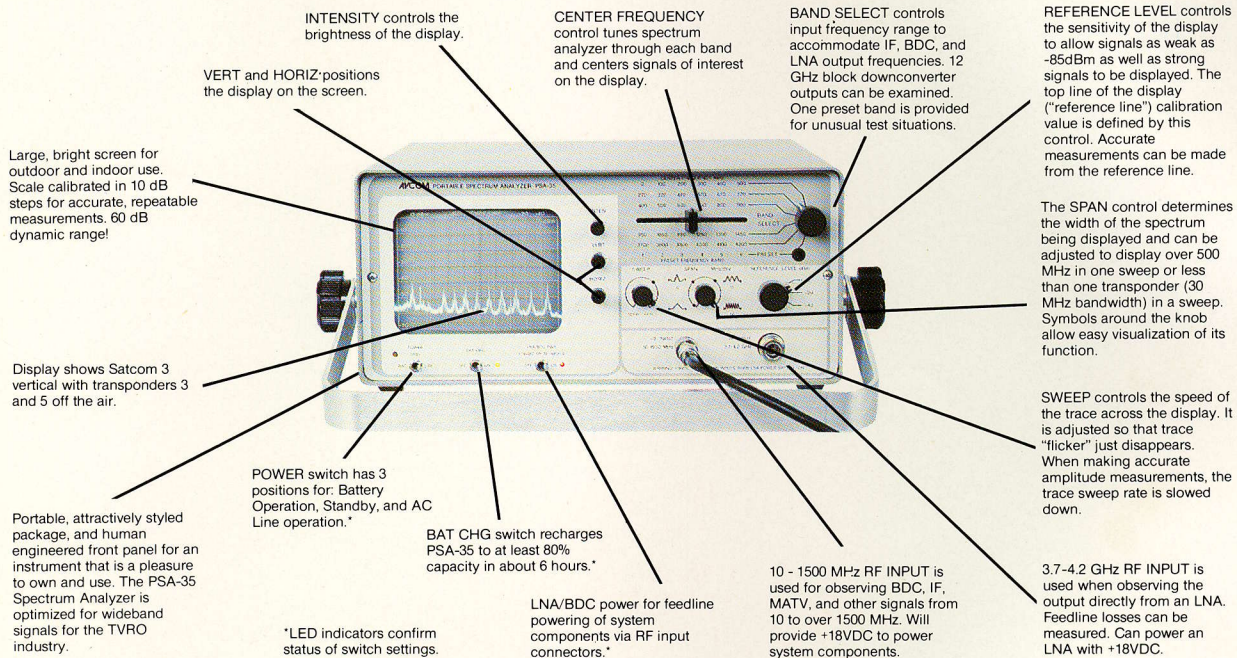
Paraclipse vs. Raydx

AVCOM's PSA-35 Portable Spectrum Analyzer

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Sophisticated enough to grow with!



KEYWORD EXPLANATIONS

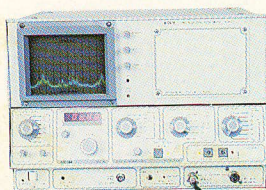
SPECTRUM ANALYZER — an instrument used to display signal amplitude vs. frequency over a selected range of frequencies (bandwidth). Amplitude is shown by the height of the trace on the screen.

REFERENCE LEVEL — in our context, a line at the top of the display that defines signal level at that point. Equally spaced lines below it at 10 dB intervals enable easy readout of various signal levels.

dBm — the most useful unit of measurement of signal strength (power) for our industry. It means decibel referenced to 1/1,000 of a watt of power. The following list will help you put dBm values into perspective:

- +20dBm — 100 mw (1/10 watt)
- +10dBm — 10 mw (1/100 watt)
- 0 dBm — 1 mw (1/1,000 watt)
- 10dBm — .1 mw
- 40 dBm — .0001 mw (typical BDC output)
- 70 dBm — typical 4 GHz feedline signal

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AVCOM's PSA-35

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TOP OF THE MONTH

RE-TRANSMITTING signals through the air, without a license, is illegal; within the United States and Canada. None-the-less, a very economical alternative to cable distribution has been created to do just this, using the 400 to 900 MHz block 'band' as a spectrum; and off-the-shelf TVRO equipment is available to reach unlimited homes without any cable. Designer **David Lantz** re-visits this subject after CSD first explored it back in the fall of 1983.

TVRO ECONOMICS, the stuff that dreams are made of, receives a special look in this issue. In part one of two, we illustrate how the 'profit margins' attached to TVRO hardware change through the distribution system. Perhaps after you have 'studied' parts one and two, you will have a better understanding as to why some suppliers 'belly-up' in our industry.

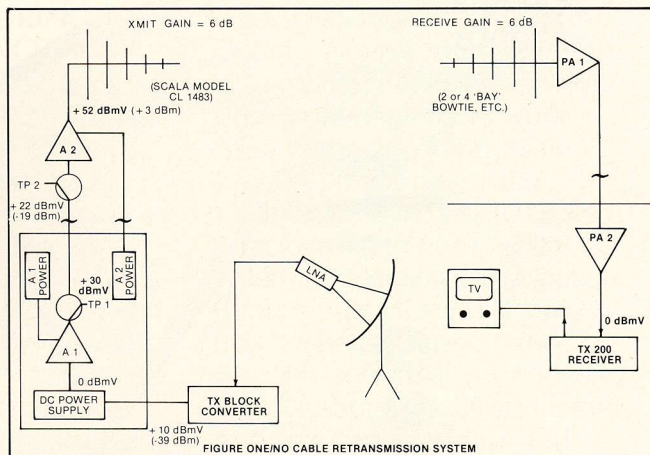
CANADIAN Mark Lewis is enthusiastic about a new computer-based receiver from Gensat and he tells us 'why' in an equipment review appearing here.

CONTINUING our four-part evaluation on the 'best of Japan', we look at the design philosophy behind the DX DSB (700) series receiver and how that creativity interfaces with the practical dealer world.

COOP has lengthy comments on scrambling scenarios including a feeling that M/A-Com's Videocipher may not be a 'shoe-in' as an industry standard after all.

SEPTEMBER 01 1985

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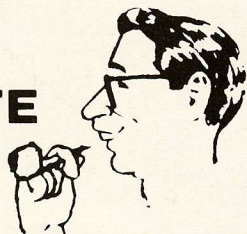


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OUR COVER/ Battle of the 'antenna giants'; **Paraclipse** and **Raydx** 'round-off' with evolutionary new designs in Nashville. Paraclipse left to right, **Steve White**, founder **David Johnson**, **Gene Willyard**. Raydx left to right **Lawrence W. Yonge (III)**, **James E. Wetz**, **Robert L. Hooper** and **Irv Cook**. 'Coop Comments' on improving antenna technology, this issue.

COOP'S SATELLITE DIGEST



INTERNATIONAL EDITION

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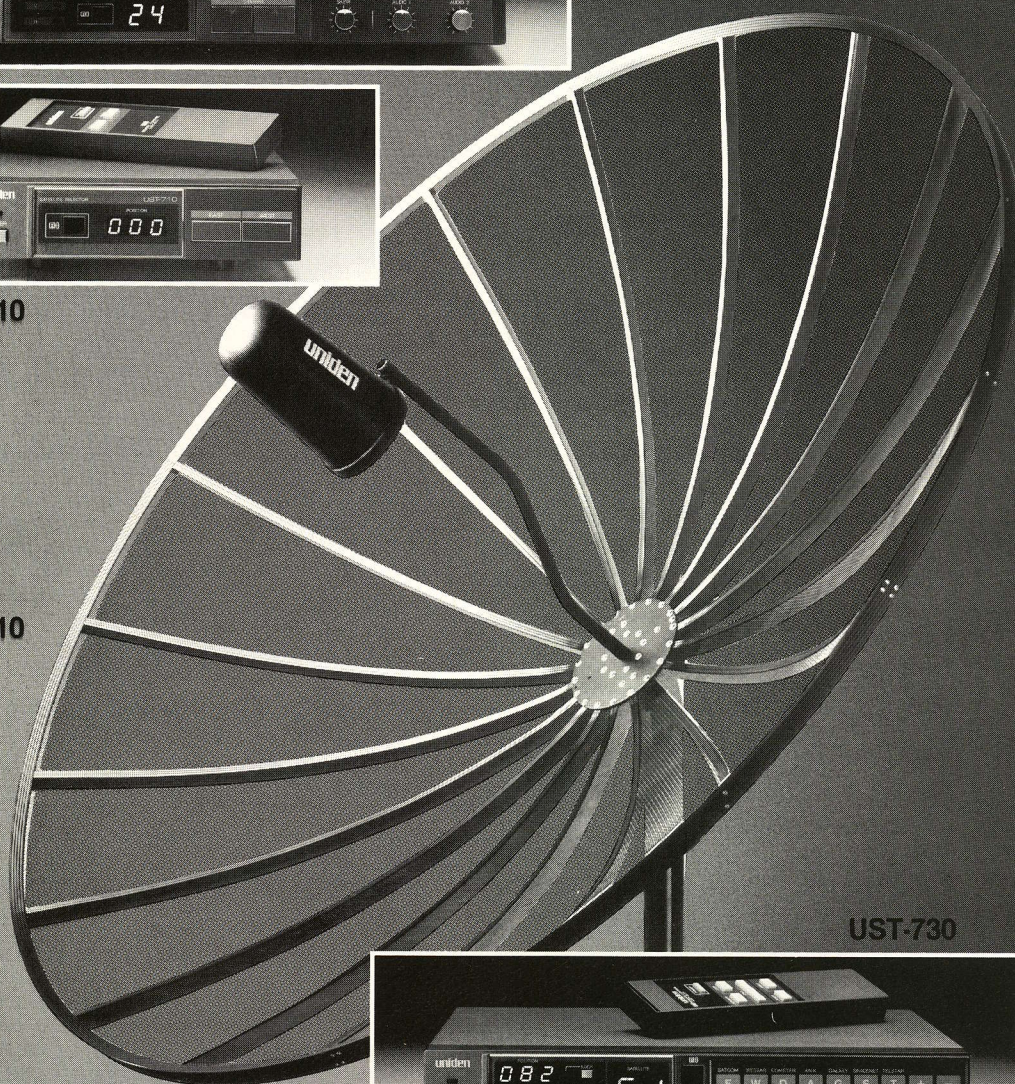


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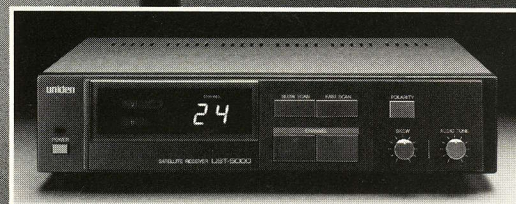
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COOP'S SATELLITE COMMENT

- 'FAIR' Scrambling Charges
- 'UNSCRAMBLED' Now, and, Forever
- BATTLE Of The Antenna Giants
- TVRO In The Bahamas

BATTLE Of The Antenna Giants

Way back in late 1982, a small California firm calling itself **Paradigm Manufacturing, Inc.** attracted attention by producing a 12 foot screen mesh antenna which worked exceptionally well. Paracclipse, during 1983, would become the leading seller of home TVRO antennas and eventually a 9 foot and then a 16 foot model would be released. Many firms tried to **copy** the Paracclipse antenna, none did it well enough to threaten the sales lead of the upstart firm headed by **David Johnson**.

In mid-1984, another antenna upstart firm calling itself **Raydx** sprung up in central Florida with a 10 foot 7 inch screen mesh antenna which defied several accepted antenna 'laws'; they made their antenna lighter and since 'light' meant less material, they brought down the pricing for TVRO antennas. **Within a year**, Raydx would be the **leading seller** of TVRO antennas, edging out Paracclipse in a close race. Raydx had more than thirty other firms **copying** their success in less than a year.

As we arrive in Nashville, both Paradigm and Raydx have bitten the competitive bullet and both recognize that fame and market lead is at best a fleeting thing good for only a brief moment in history. As our front cover shows this month, both firms have squared off at one another, and at the balance of the industry, with some new antenna designs which they expect will have a profound impact on their market shares for the next 12 months.

Paradigm made screen mesh antennas the good old-fashioned way; solid, true, and rugged. **Raydx applied** space age design technology to their antenna and found out that you could be lightweight and still be strong and rugged.

Paradigm's Johnson, perhaps the brightest antenna marketer in our industry today, virtually lives in his company's airplane traveling as many as 10,000 miles in a typical week meeting with dealers, distributors and potential accounts. He has been listening and studying the competition for more than a year, mindful that his firm's tremendous new production capabilities cannot be put to proper use unless the market itself grows, and, his own market share gets bigger.

Raydx's marketing team, headed up by **Irv Cook**, has had its greatest strength in the south and east; at the opposite end of the country where Paracclipse antennas are a legend in their own time. But the numbers, of late, have been tipping more and more in Raydx's favor. One reasonable explanation has been the rapid growth this year of TVRO in the southeast; considered by many to be the number one growth area in TVRO during 1985. Raydx is doing more than introducing a new antenna (see front cover, this month) in Nashville; they are also introducing their first production model receiver. Why would a firm with the lion's share of the antenna market move into electronics?

"**New ideas, innovation**" suggests Cook. "**We have found an answer to competing with offshore electronic manufacturers, right here in the USA.**" Raydx will show off a receiver that does one very interesting thing; without using the block downconversion approach, they say you can stack up multiple receivers on the same antenna (a Raydx antenna, natch!) and give each non-block receiver totally independent access to any transponder on the bird. How do they do it? Cleverly, and with a marketing program for their receiver

which will turn some eyebrows. "**We want the dealer to feel totally comfortable handling our new, innovative, receiver**" says Cook. "**So if it quits**, for any reason, **they send them a new one; promptly, no questions asked.**" No, distributors and dealers won't be 'learning' how to repair Raydx units according to Cook; they won't have to with the one-for-one trade policy behind the product.

To get ready for adding electronics to their line, Raydx has spent some big dollars to equip a new 10,000 square foot totally automated factory for receivers. The facility may be the most electronic-automated receiver plant in the world today; raw parts are computer fed into circuit boards, the boards are soldered and completed and the **first person to touch** a receiver is the alignment tech at the **end** of the production line. Raydx figures they have reduced labor costs to the absolute lowest possible factor.

With factory one-for-one replacement, and total automation, Raydx's receiver approach may have brought us a step closer to 'throw-away' TVRO receivers; if it doesn't work, rip it out and stick in a new one.

Paradigm's Johnson, meanwhile, has a cautious smile on his lips; never one to under estimate the strengths and talents of a competitor, Johnson ponders whether Raydx's new infatuation with receivers and electronics may sap some of their competitive strength and energy in the **antenna** field. Both firms are 'coming out' in Nashville loaded for a stiff, competitive, fall selling season. Their continued R and D, and their improved products will benefit each of us at the dealer and distributor level.

SHAME ON 'Who'?

On the August 1st edition of Boresight (*) Shaun Kenny did an editorial, his opinion as it were, following a press release/announcement from M/A-Com. Late in July, M/A-Com announced that they had found their first 'licensee' for the VC2000E descrambler and their VC2000M 'IRD' or integrated receiver module. The firm? **Channel Master**.

Channel Master started in this business early; their top execs sat in my living room in the spring of 1980 in Arcadia, Oklahoma and we talked about TVRO hardware and what type of system challenges they might direct their considerable corporate attention towards. They began by buying antennas in Arkansas and receivers in Ohio and packaging these and other components into complete systems. Channel Master has a peculiar 'nitch' in TVRO; they have a set of 'house account' dealers who have grown up over ten, twenty and even thirty years being comfortable with Channel Master MATV equipment. They do their own thing, conduct their own surveys, and sell largely to their own dealers who by-and-large I suspect do not handle anyone else's TVRO hardware. Measuring Channel Master impact in TVRO is therefore difficult because they don't really participate in the mainstream of TVRO hardware or even software. That's good for them.

On August 1st, Shaun Kenny editorialized "**One of the biggest weapons we have as TVRO dealers against the insanity of**

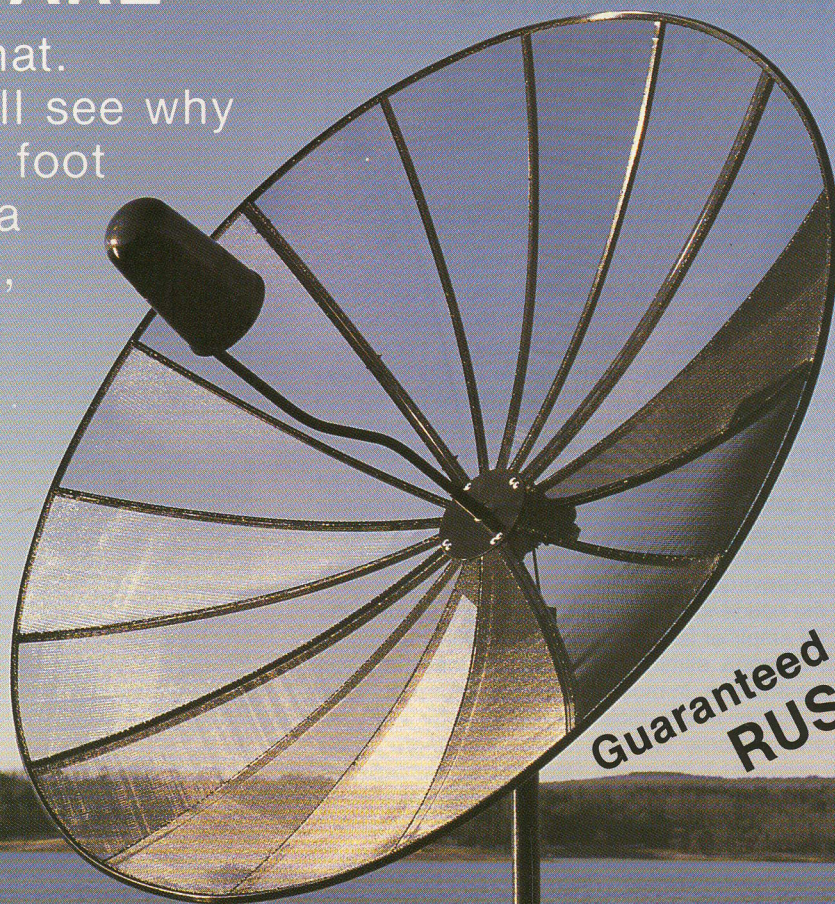
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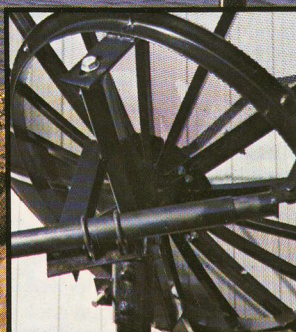


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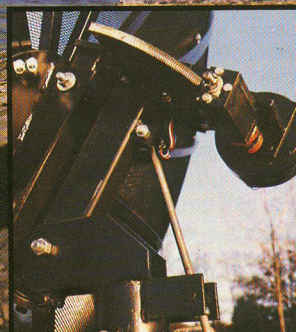
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NO-CABLE-NEEDED BDC SHARING SYSTEM

The output of a dielectric stabilized blockconverter or LNB may be transmitted and received in a way similar to the method used by the satellites. **Figure 1** traces the signal level path of the satellite signals as they leave the TX DC 24 Block-converter. A power broadband amplifier drives the FM signals into a commercial grade UHF broadband transmit antenna. The signals travel through the air and are received by another broadband UHF antenna. A broadband pre-amplifier mounted on the receive antenna, similar in function to an LNA, amplifies the received signal. The set top TX 200 receiver is used to convert the received FM signal into a TV compatible signal (1).

The blockdownconverted satellite signals are pre-amplified at the headend by the first LX 50. The output of the **second LX 50** amplifier is connected **directly** to the input of the transmit antenna eliminating the cable loss from the headend to the antenna. In most small systems the TX LX 50 Distribution Amplifier is a sufficient transmitter for UHF 're-radiation' systems. Some systems may require more power than the 200 milliwatt LX 50 output. For those systems 1 watt, 5 watt, 10 watt, 50 watt, or even 100 watt amplifiers are available (2).

The concept of 'sharing' TVRO signals by re-broadcasting the TVRO received signals through a terrestrial transmitter is hardly new; CSD has written extensively about this concept, and practice, starting in 1980. In November of 1983, CSD suggested a new technique; receiving the full (500 MHz) band of signals, processing those signals in a broadbanded (BDC) system and then re-amplifying those signals for re-transmission in their original wideband FM format. A **test system** using this approach has operated in the Turks and Caicos Islands for nearly two years, with less than 1/1000th of a watt of power at the transmitter; good pictures and sound out to several miles is recovered using home-style broadbanded UHF consumer home antennas at receiving sites feeding TVRO style BDC receivers. In effect, the 'ether' (air) replaces the cable normally required to connect a 'master downlink antenna' to off-premise receivers. **David Lantz**, one of the early practioners of this 'illegal art' shares some of the hard-learned design criteria with you here. **This warning;** the system described is not legal in the United States nor Canada. Oh yes; viewers of our BORESIGHT television program series saw just such a system in 'test/experimental operation' this past June 27th when we visited **Keith Anderson** in South Dakota.

by **David Lantz**
NETWORK COMMUNICATION SERVICES
16134 128th Avenue SE
Renton, Washington 98058
(206/271-5636)



LANTZ/ on right with four-bay bow-tie UHF antenna suitable for use in re-radiation transmission described here. Lantz was at CSD Lab on Provo testing original system in fall of 1983 at time this photo was taken.

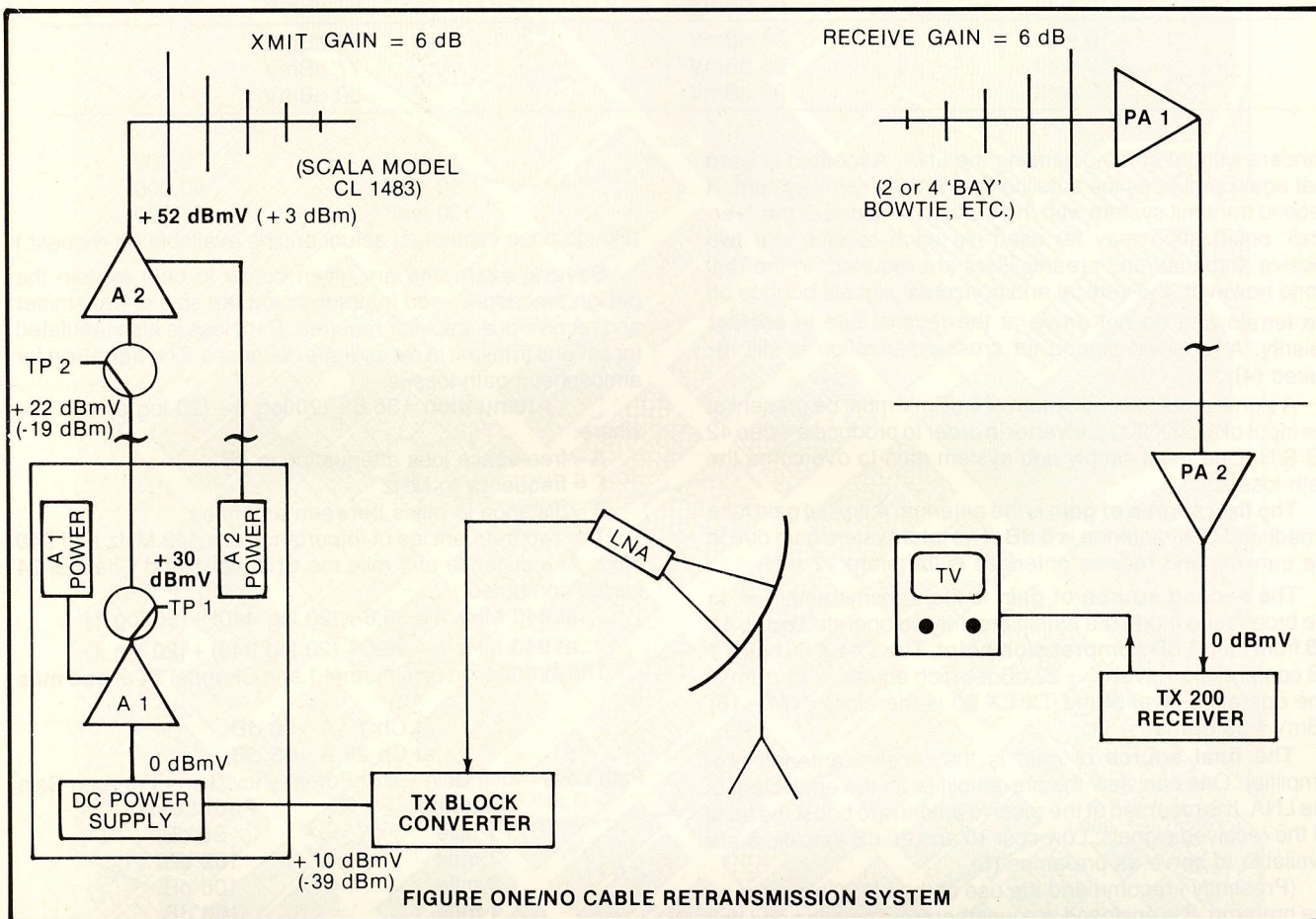
The maximum output power of the LX 50 is controlled by an Automatic Level Control circuit. This level will be maintained at the amplifier output, independent of input signal variations of up to 10 dB. The amplifier at the transmitter is therefore free from adjustment. I personally do not like to climb towers to make amplifier adjustments. Any signal level adjustments required may be made at the headend amplifier.

The TX downconverter connected by 15 feet of RG 214 will have an approximate output level of (+ 10 dBmV). An LNB may also be used in place of the LNA and downconverter combination. I personally prefer the LNB in that there is one less piece of electronics that must be weatherized. It is safe to assume the cable loss from the downconverter to the headend will be less than 10 dB. This puts the input to the first amplifier at greater than 0 dBmV. The LX 50 amplifier gain is pre-set to a maximum of (+ 36 dB). The output of the headend amplifier is approximately 36 dBmV at channel 24. Up to 16 dB of cable loss to the second amplifier can be tolerated and still drive the transmit amplifier at its maximum of + 52 dBmV for each of the **24** channels. (The **TX receivers** are aligned for cross polarized reception by the use of high Q SAW filters (3)). If only 12 channels are being transmitted, the ALC circuitry adjusts the maximum per channel up to approximately (+ 56 dBmV). The

ALC circuitry also allows the transmit amplifier to be hit with up to +32 dBmV without overdriving and creating inter-

modulation distortion.

A second method may be used to transmit all 24 trans-



Application Notes

- 1) Amplifier **A1** is a TX LX-50 amplifier with Automatic Level Control and pre-set tilt control.
- 2) Amplifier **A2** may be a second TX LX-50 amplifier or a higher power broadband transmit amplifier. The impedance of the second amplifier must also be 75 ohms or matching transformers will be required.
- 3) The Scala CL1483 transmit antenna suggested is available in both 75 ohm and 50 ohm versions.
- 4) Path loss is based upon a clear line of sight from the transmit antenna to the receive antennae. Obstructions such as trees will greatly increase the path loss.
- 5) The **PA1** preamplifier at each receive antenna should be mounted **directly to the antenna** to preserve the S/N ratio. The **PA2** amplifier may be located indoors at the TX 200 receiver input.

1/ Lantz has a commercial arrangement with **TX Engineering** and his experience is largely with their receiving equipment; much of which he designed himself. **Tests conducted by CSD** at the **West Indies Video** lab site in the **Turks and Caicos Islands** originally included Anderson Scientific receivers which we found, on a selected basis with equally selected TX units, to be equal in performance. More recently, other popular receivers with 400/900 (430-930 or 450-950) MHz 'block IFs' have become available from Janeil, Ramsey, Maxum, and many others. Doubtless, some will work better than others in this application and anyone planning to duplicate such a system is advised to test stock receivers from several sources before making a 'buy decision.'

2/ The availability of 1, 5, et al watt broadbanded amplifiers covering the 400-900 MHz band should not be taken 'lightly.' After several years of development, **Anderson Scientific** has created a unit which is capable of approximately **3 watts** peak

power per satellite transponder (with 12 satellite transponders). Higher powers are very difficult to attain without intermodulation (interference) products being generated within the power amplifier. Potential system planners should insist on **seeing an operating system** which claims more than 3 watts of power per transponder in advance of placing any orders.

3/ It is possible, given excellent engineering skills, to place the receive antenna polarization 'probe' half-way between vertical and horizontal and receive up to 24 (12 vertical, 12 horizontal) signals and then re-transmit those signals. **However**, tests conducted by CSD suggest that this is a very tricky procedure requiring more skills than one is apt to find in 'third world' countries where this system may be used without fear of reprisals from local licensing authorities and we therefore suggest that potential users of this system 'scale down' their aspirations to a 12 channel, single polarization, system.

AMPLIFIER	1dB Comp. Point	Safe Operating Level
LX 50		
0.2 watt	71 dBmV	53 dBmV
1 watt	78 dBmV	60 dBmV
5 watt	85 dBmV	67 dBmV
10 watt	88 dBmV	70 dBmV
50 watt	95 dBmV	77 dBmV
100 watt	98 dBmV	80 dBmV

ponders without cross-polarizing the LNA. A method is used that again simulates the satellite downlink transmit system. A second transmit system with the transmit antenna in the "vertical" polarization may be used. At each receive site two receive antennas and preamplifiers are required. In the real world however, the vertical and horizontal signals bounce off the terrain and do not arrive at the receive site in **perfect** polarity. A receiver aligned for cross-polarization is still required (4).

A signal amplitude minimum of 0 dBmV must be present at the input of the TX 200 converter in order to produce a video 42 dB S/N. One must simply add system gain to overcome the path-losses.

The **first source of gain** is the antenna. A typical gain for a broadband UHF antenna is **6 dB**. The total system gain due to the transmit **and** receive antennas is therefore **12 dB**.

The **second source of gain** is the transmit amplifier. In the broadband mode the amplifiers may be operated **up to 18 dB** from their **1 dB compression point**. The TX LX 50 has a 1 dB compression level of +22 dBm which equals +71 dBmV. The operating level of the TX LX 50 is therefore = (71 - 18) dBmV = 53 dBmV.

The **final source** of gain is the receive antenna pre-amplifier. One can view the pre-amplifier as the equivalent of the LNA. It is mounted at the receive antenna to boost the level of the received signals. Low cost 10 and 20 dB amplifiers are available to serve as pre-amps (5).

(Presently I recommend the use of the LX 50 amplifier as the pre-amp. It is enclosed in a weatherproof housing and has the necessary tilt compensation to provide flat incoming signals.)

The decision as to the amount and location of the gain stages in the transmit / receive system is a compromise between performance, repeatability and cost. When many receive stations are anticipated, the additional cost of increasing the transmitter output may be less than adding additional gain stages at **each** receive site. Several installations in rural Canada have used the LX-50 amplifier as the signal conditioning (receive) pre-amplifier for the higher power transmitters.

TRANSMITTER	U.S. DOLLARS
LX 50 200 mw	400
1 watt	1,900
5 watt	3,600

4/ In the real world, a receiver with **very sharp** IF bandpass filter skirts plus an IF bandwidth in the 20 to 21 MHz region is required to properly separate cross-polarized signals transmitted by the same broadbanded 're-radiation/antenna' system. **TX receivers** have been designed for this specific system requirement while many others, tuning the 400-900 MHz (nominal) band, have IF bandwidths too wide to allow cross-polarized terrestrial reception. The receiver bandwidth would **not be** a consideration in a **single polarity** processing system.

10 watt	9,000
50 watt	40,000
100 watt	51,500

(Rough price estimates, actual pricing available on request.)

Several examples are given below to help explain the design procedure used in determining the size of transmitter and receive pre-amplifier required. Path loss is also tabulated for several transmit to receive site distances. The **equation** for atmospheric path loss is:

$$\text{Attenuation} = 36.6 + (20 \log f) + (20 \log d)$$

where:

A = free-space loss attenuation in dB

f = frequency in MHz

d = distance in miles between antennas

The two frequencies of importance are 440 MHz and 940 MHz. At a distance of 1 mile the Channel 1 and Channel 24 losses computed:

$$\text{at 440 MHz } A = 36.6 + (20 \log 440) + (20 \log 1)$$

$$\text{at 940 MHz } A = 36.6 + (20 \log 940) + (20 \log 1)$$

The attenuation on Channel 1 and Channel 24 at **one mile** is:

$$\text{at Ch 1 } A = 90 \text{ dB}$$

$$\text{at Ch 24 } A = 96 \text{ dB}$$

$$\text{Path Loss} = \text{Xmit Gain} + \text{Xmit Power} + \text{Rcv Gain} + \text{Pre-Amp Gain}$$

Distance	Path Loss
1 mile	= 96 dB
2 mile	= 102 dB
3 mile	= 106 dB
4 mile	= 108 dB
5 mile	= 110 dB
6 mile	= 112 dB

CASE 1: LX 50 TRANSMITTER

The transmit power of the LX 50 amplifier is 53 dBmV. Both the transmit antenna and the receive antenna have gains of 6 dB. The amount of pre-amp gain required at a distance of one mile from the transmit site can be calculated:

$$\text{Path Loss} = \text{Xmit Gain} + \text{Xmit Power} + \text{Rcv Gain} + \text{Pre-Amp Gain}$$

$$96 = 6 + 53 \text{ dBmV} + 6 + \text{Pre-Amp Gain}$$

$$\text{Pre-Amp Gain} = \text{Path Loss} - \text{Xmit Gain} - \text{Xmit Power} - \text{Rcv Gain}$$

$$\text{Pre-Amp Gain} = 96 - 6 - 53 - 6 = 31 \text{ dB}$$

$$\text{At a distance of one mile pre-amp Gain} = 96 - 65 = 31 \text{ dB}$$

$$\text{At a distance of two miles pre-amp Gain} = 102 - 65 = 37 \text{ dB}$$

$$\text{At a distance of three miles pre-amp Gain} = 106 - 65 = 41 \text{ dB}$$

5/ See Part One of the Lantz series, appearing in **CSD** for **May 01, 1985** for a discussion of available 10 to 20 dB line amplifiers which can also serve as antenna-mounting 'pre-amplifiers' in this application. Such amplifiers must be capable of being line powered, must match the (IF) bandwidth of the 're-radiation' system, and somehow the impedance of the home receiving antenna (typically 300 ohms) must be 'matched' to the input impedance of the signal pre-amplifier (typically 75 ohms). Since the pre-amplifier mounts out-of-doors, at the antenna, it must also be weatherproof.

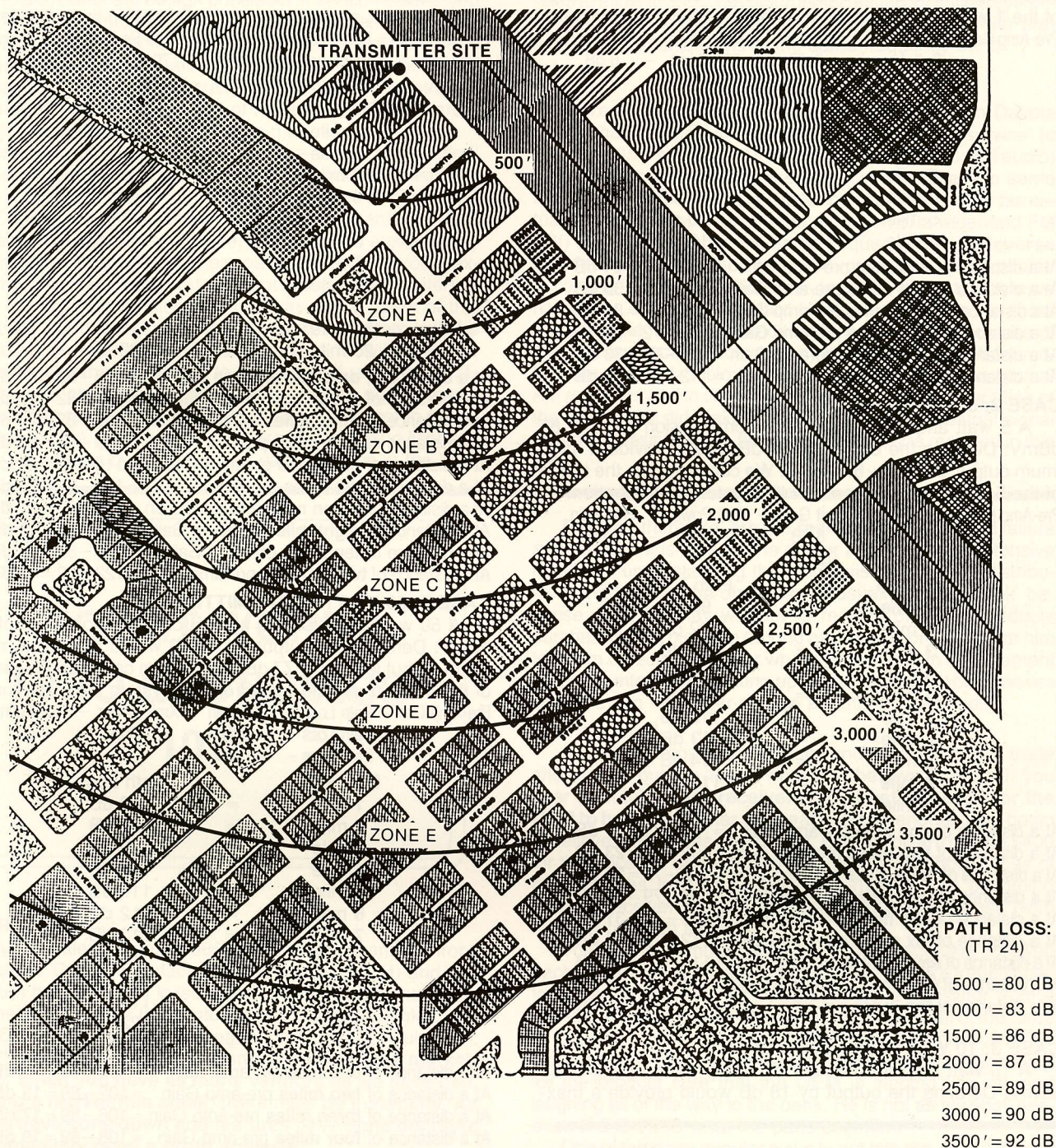


FIGURE TWO/ Example of a no-cable BDC re-radiation system community. The covered region is broken into path-loss-zones. Using the TX LX-50 amplifier as a transmitter (see 'Case 1' in text), we would require less than 28 dB of pre-amplifier gain (total of PA1 and PA2) to compensate for the path loss to 'Zone E'. A 5 watt transmitter, on the other hand, would require 14 dB less pre-amplifier gain for a 0 dBmV signal level into the most distant (Zone E) region; using the antenna gains noted in the text. Also note that path loss is very dependent upon having 'clear' line-of-sight from each receive antenna to the transmission antenna, and that receive-site coaxial cable line losses must also be considered in the equation.

At a distance of **four miles** pre-amp Gain = $108 - 65 = 43$ dB
 At a distance of **five miles** pre-amp Gain = $110 - 65 = 45$ dB
 At a distance of **six miles** pre-amp Gain = $112 - 65 = 47$ dB

CASE 2: 1 WATT TRANSMITTER

A 1 watt amplifier has a 1 dB compression point of 78 dBmV. Derating the output by 18 dB would provide a max-

imum output level of +60 dBmV. We can calculate the range of the **1 watt** system based on the system link equation (6).

$$\begin{aligned}\text{Pre-Amp Gain} &= \text{Path Loss} - \text{Xmit Gain} - \text{Xmit Power} - \text{Rcv Gain} \\ &= \text{Path Loss} - 6 \text{ dB} - 60 \text{ dBmV} - 6 \text{ dB} \\ &= \text{Path Loss} - 72 \text{ dB}\end{aligned}$$

Distance	Path Loss
1 mile	= 96 dB
2 mile	= 102 dB
3 mile	= 106 dB
4 mile	= 108 dB
5 mile	= 110 dB
6 mile	= 112 dB

At a distance of **one mile** pre-amp Gain = $96 - 72 = 24 \text{ dB}$

At a distance of **two miles** pre-amp Gain = $102 - 72 = 30 \text{ dB}$

At a distance of **three miles** pre-amp Gain = $106 - 72 = 34 \text{ dB}$

At a distance of **four miles** pre-amp Gain = $108 - 72 = 36 \text{ dB}$

At a distance of **five miles** pre-amp Gain = $110 - 72 = 38 \text{ dB}$

At a distance of **six miles** pre-amp Gain = $112 - 72 = 40 \text{ dB}$

CASE 2: 5 WATT TRANSMITTER

A 5 watt amplifier has a 1 dB compression point of 85 dBmV. Derating the output by 18 dB would provide a maximum output level of +67 dBmV. We can calculate the range of the **5 watt** system based on the system link equation.

$$\begin{aligned}\text{Pre-Amp Gain} &= \text{Path Loss} - \text{Xmit Gain} - \text{Xmit Power} - \text{Rcv Gain} \\ &= \text{Path Loss} - 6 \text{ dB} - 67 \text{ dBmV} - 6 \text{ dB} \\ &= \text{Path Loss} - 79 \text{ dB}\end{aligned}$$

Distance	Path Loss
1 mile	= 96 dB
2 mile	= 102 dB
3 mile	= 106 dB
4 mile	= 108 dB
5 mile	= 110 dB
6 mile	= 112 dB
7 mile	= 113 dB
8 mile	= 114 dB
9 mile	= 115 dB
10 mile	= 116 dB

At a distance of **one mile** pre-amp Gain = $96 - 79 = 17 \text{ dB}$

At a distance of **two miles** pre-amp Gain = $102 - 79 = 23 \text{ dB}$

At a distance of **three miles** pre-amp Gain = $106 - 79 = 27 \text{ dB}$

At a distance of **four miles** pre-amp Gain = $108 - 79 = 29 \text{ dB}$

At a distance of **five miles** pre-amp Gain = $110 - 79 = 31 \text{ dB}$

At a distance of **six miles** pre-amp Gain = $112 - 79 = 33 \text{ dB}$

At a distance of **seven miles** pre-amp Gain = $113 - 79 = 34 \text{ dB}$

At a distance of **eight miles** pre-amp Gain = $114 - 79 = 35 \text{ dB}$

At a distance of **ten miles** pre-amp Gain = $116 - 79 = 37 \text{ dB}$

CASE 3: 10 WATT TRANSMITTER

A 10 watt amplifier has a 1 dB compression point of 88 dBmV. Derating the output by 18 dB would provide a maximum output level of +70 dBmV. We can calculate the range of the **10 watt** system based on the system link equation.

imum output level of +70 dBmV. We can calculate the range of the **10 watt** system based on the system link equation.

$$\begin{aligned}\text{Pre Amp Gain} &= \text{Path Loss} - \text{Xmit Gain} - \text{Xmit Power} - \text{Rcv Gain} \\ &= \text{Path Loss} - 6 \text{ dB} - 70 \text{ dBmV} - 6 \text{ dB} \\ &= \text{Path Loss} - 82 \text{ dB}\end{aligned}$$

Distance	Path Loss
1 mile	= 96 dB
2 mile	= 102 dB
3 mile	= 106 dB
4 mile	= 108 dB
5 mile	= 110 dB
6 mile	= 112 dB
7 mile	= 113 dB
8 mile	= 114 dB
9 mile	= 115 dB
10 mile	= 116 dB
20 mile	= 122 dB

At a distance of **one mile** pre-amp Gain = $96 - 82 = 14 \text{ dB}$

At a distance of **two miles** pre-amp Gain = $102 - 82 = 20 \text{ dB}$

At a distance of **three miles** pre-amp Gain = $106 - 82 = 24 \text{ dB}$

At a distance of **four miles** pre-amp Gain = $108 - 82 = 26 \text{ dB}$

At a distance of **five miles** pre-amp Gain = $110 - 82 = 27 \text{ dB}$

At a distance of **six miles** pre-amp Gain = $112 - 82 = 30 \text{ dB}$

At a distance of **seven miles** pre-amp Gain = $113 - 82 = 31 \text{ dB}$

At a distance of **eight miles** pre-amp Gain = $114 - 82 = 32 \text{ dB}$

At a distance of **ten miles** pre-amp Gain = $116 - 82 = 34 \text{ dB}$

At a distance of **twenty miles** pre-amp Gain = $122 - 82 = 40 \text{ dB}$

CASE 4: 50 WATT TRANSMITTER

A 50 watt amplifier has a 1 dB compression point of 95 dBmV. Derating the output by 18 dB would provide a maximum output level of +77 dBmV. We can calculate the range of the **50 watt** system based on the system link equation.

$$\begin{aligned}\text{Pre-Amp Gain} &= \text{Path Loss} - \text{Xmit Gain} - \text{Xmit Power} - \text{Rcv Gain} \\ &= \text{Path Loss} - 6 \text{ dB} - 77 \text{ dBmV} - 6 \text{ dB} \\ &= \text{Path Loss} - 89 \text{ dB}\end{aligned}$$

Distance	Path Loss
1 mile	= 96 dB
2 mile	= 102 dB
3 mile	= 106 dB
4 mile	= 108 dB
5 mile	= 110 dB
6 mile	= 112 dB
7 mile	= 113 dB
8 mile	= 114 dB
9 mile	= 115 dB
10 mile	= 116 dB
20 mile	= 122 dB
40 mile	= 128 dB

At a distance of **one mile** pre-amp Gain = $96 - 89 = 7 \text{ dB}$

At a distance of **two miles** pre-amp Gain = $102 - 89 = 13 \text{ dB}$

At a distance of **three miles** pre-amp Gain = $106 - 89 = 17 \text{ dB}$

At a distance of **four miles** pre-amp Gain = $108 - 89 = 19 \text{ dB}$

At a distance of **five miles** pre-amp Gain = $110 - 89 = 21 \text{ dB}$

At a distance of **six miles** pre-amp Gain = $112 - 89 = 23 \text{ dB}$

At a distance of **seven miles** pre-amp Gain = $113 - 89 = 25 \text{ dB}$

At a distance of **eight miles** pre-amp Gain = $114 - 89 = 26 \text{ dB}$

At a distance of **ten miles** pre-amp Gain = $116 - 89 = 28 \text{ dB}$

At a distance of **twenty miles** pre-amp Gain = $122 - 89 = 34 \text{ dB}$

At a distance of **forty miles** pre-amp Gain = $128 - 89 = 40 \text{ dB}$

CONCLUSION

The distribution of the **UHF** 'block' of satellite signals (400-900 MHz) to virtually an unlimited number of receivers has one distinct advantage over distribution methods for the **950-1450**

6/ Lantz's range versus pre-amplifier gain calculations fit closely our own experience in the test system operated on Provo since the fall of 1983. **However**, tests conducted by **Keith Anderson** in South Dakota with approximately 1/2 watt-per-transponder suggest that carefully designed BDC receivers with good noise figures, internal gain and IF bandwidth selection **can reduce the need** for a signal pre-amplifier or greatly reduce the amount of pre-amplifier gain required. On this point, Lantz and Anderson disagree; and it is not a 'small point' since eliminating (or reducing) the gain requirements for the receive-site home pre-amplifiers has a dramatic impact on the cost-per-home served.

MHz (BDC) band; the design principals in effect, whether you elect to transmit through the air or through cable, are virtually from the 'CATV textbook.' This means that component parts are generally available (although some careful 'spec'ing' of the parts is mandatory because of the operation **above** the nominal 850-870 MHz 'cut off' of most CATV/MATV parts), and the technology is already quite mature.

Potential users of the 'through-the-air' or 're-radiation' system described here are well advised (and cautioned) that while some 'experiments' have been conducted within the US and Canada using this technique, there is presently no FCC licensing provision for such a 'service.' Isolated areas, valley communities for example, where natural terrain shielding exists, may find they can operate without fear of creating interference to normal (television and two-way radio) users of this spectrum but the plain fact is that **such a system will be illegal** (within the USA and Canada) and the risk will always be present that it may be forced to shut down if uncovered (7).

This is a case where the technology, once again, 'leads' the regulations by probably several years. Interest in promulgating such a service on a widespread, legal, and licensed basis would start by attempting to gain changes in the FCC

rules to allow at least 'developmental testing' of such a system in rural areas where no interference would occur with pre-existing communications in the same frequency band.

7/ Tests conducted by Keith Anderson in South Dakota reveal that it is possible for this 'FM broadband service' to co-exist with over-the-air UHF television (AM video, FM audio) services also operating in the same spectrum at the same time; in the worst case, the presence of a strong UHF terrestrial TV signal simply eliminates reception of a wideband FM (TV) signal operating in the same frequency range. **Reverse interference**, wideband FM to AM, cannot be substantiated according to Anderson. However, in CSD/WIV tests where we have three operating standard (AM) transmitters in the same band, we did find that in addition to losing the service/use of the spectrum portion occupied by the terrestrial AM transmitters, we could also 'slope tune-in' the FM signals on normal AM receivers and in one instance the co-frequency location of the two signals did make reception of an AM terrestrial signal **audio** impossible. More field work obviously is required in this area.

HOW IT WORKS: TVRO ECONOMICS 101A

SECRET Stuff

During calendar year 1985, several significant 'up front' leaders in TVRO manufacturing technology (OEM) and distribution have suffered losses; and in some cases those losses have forced the firms into various levels of bankruptcy. M/A-Com's **Jim Bunker**, appearing in CSD/2 for July 15th, said **"There have been too many vendors in the marketplace. When you have as many vendors as we have had, serving a market this small, there must be instability. As prices have gone down and features have gone up, there has obviously been a profit squeeze."**

On the surface, the failure of an **Intersat** would have a direct impact on only the principals and employees of the firm. The knife cuts far deeper than that, however; when an Intersat fails there are distributors handling the product who are caught with an inventory of product which they may not be able to move. And there are dealers caught in the same spot, and who are also the victims when product already in the field breaks and must be returned to the factory for repair. **There is no longer a factory** and in the case of the Intersat IQ-160 unit, with a moderately high rate of field problems, there are (by factory admission) 15,000 consumers out there with a slow-ticking time bomb in their homes.

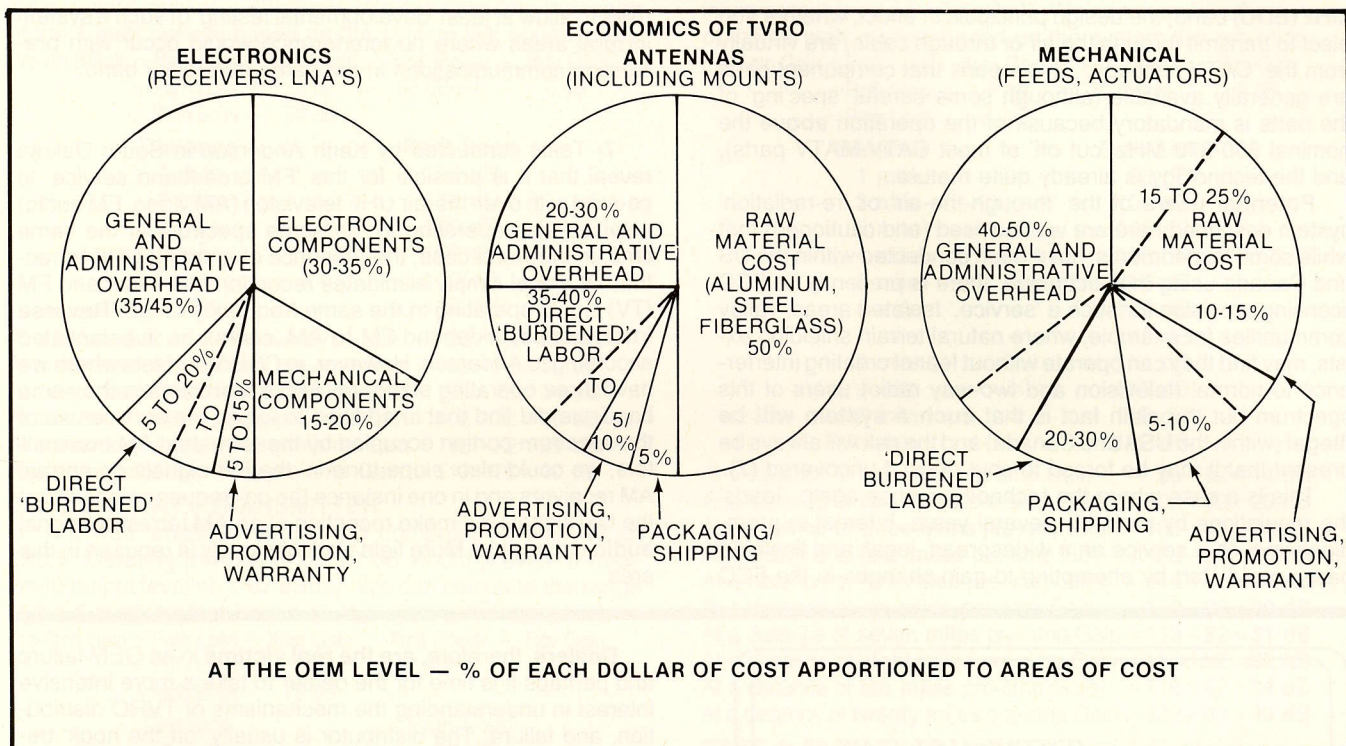
Dealers, therefore, are the real victims in an OEM failure and perhaps it is time for the dealer to take a more intensive interest in understanding the mechanisms of TVRO distribution, and failure. The distributor is usually 'off the hook' because while he may warrant to replace or repair products purchased from his shop as long as there is someplace for him to return defective units, or where he can obtain replacement parts, his interest in backing up such a product rapidly leaves when he can no longer get the assistance he needs.

WHY Failure?

If you hang around the industry and attend sufficient trade shows, you quickly 'learn' what you **believe** is gospel; you hear such things as **"receivers only cost \$90 each for the OEM to build"** and after you hear this long enough, you begin to believe those types of numbers. Even if you are paying \$400 for that receiver at the dealer level. Believing those types of numbers has lead more than one investor into becoming another 'receiver supplier' to our already overburdened (with receiver product) industry.

The truth is far more complicated than "receivers cost \$90 each". Even when you are listening, at the bar at a trade show, to someone who sounds like they know a transistor from a resistor as he expounds on how 'he' diagnosed all of the parts in receiver 'X' and added up the value and came to \$48.76. Listening to this, you grit your teeth at the \$400 you are paying for the product sure that the OEM is 'ripping you off' and laughing all of the way to the bank. He is not as we shall see, **even if \$48.76 IS what the parts cost him.**

One of the more popular ways to get into the TVRO receiver business is to take a receiver design to Korea or Taiwan or Japan and ask for quotes on getting it built. The numbers that come back to you may well be in the \$90 region per receiver, given say 3,000 per month as the order quantity. That price, however, will be for the 'basic receiver' and it will not include such additional and required parts as say a downconverter (which the wise 'manufacturer' thinks twice about before allowing some shop in Korea to build for him!). So what does a downconverter cost? Some are available for as little as \$30 in quantity but that may not be one you can or would use with a 'quartz tuned, frequency synthesized' receiver package (since downconverter stability is important for quartz tuned receivers



to perform).

Even if we assume the downconverter is going to cost the receiver OEM \$50 and he has paid \$90 for his imported receiver, he has \$140 'total cost' in a package which you, the dealer, are paying perhaps \$400 for. You still feel like you are being 'ripped off'; right? **Wrong.**

The truth is, as noted, far more complex and even a tad complicated. Let's see why.

WHAT Costs What?

In our first 'pie-study' we see what various categories of products might cost the OEM, at his 'original equipment manufacturing' (OEM) level. We've broken this down into percentages of total cost since the basic units follow one another quite closely regardless of the final price asked of the dealer.

Of the total price paid by the dealer, the largest percentage of 'raw material cost' is awarded to the antenna business. The only way to continue to take big chunks out of the cost of an antenna is to take big chunks of material out of the antenna. That is the primary reason why 'lighter weight' antennas have blossomed in the past 12 months; to get the price down and down some more, the weight of the antenna (all antenna parts, whether metal or fiberglass, are basically a 'so-much-per-pound' problem) must come down. Interestingly, a pound of raw aluminum costs just about the same as a pound of fiberglass, in place. A pound of raw steel, in today's steel market, costs less by 30-40% and that is why the recent popularity in steel mesh antennas has come along.

In the direct labor department, the antennas also are tops; they require more 'man hours' for creation than a receiver, for example. Labor for actuators with companion controllers come in second in most shops. **Direct burdened labor?** Perhaps we should define some terms here before we go any further.

1) **Raw Material Cost/ Electronic Components:** That's

the unmolded stuff you start with; the bits and pieces, parts as it were, whether they are transistors/capacitors/resistors, or, sheets of aluminum/steel or pounds of fiberglass resin and matting.

- 2) **Packaging/Shipping:** Once you have the device created, you must get it from the OEM shop to either a distributor or a dealer. That costs money; money to put it into a container (if it ships that way; many antennas do not) and money to deliver it to the buyer.
- 3) **Advertising/Promotion/Warranty:** Brochures, trade magazine advertising, consumer advertising placards for the dealer stores, **going to trade shows** to display, buying a distributor or dealer a lunch or giving him a basketball; it all adds up. **Warranty?** Every intelligent manufacturer assumes he will have some percentage of product failure and that if he offers a warranty, it will cost him money to make good on that warranty. The OEM may not actually 'stick away' a percentage of his gross receipts to cover warranty (although that is the right way to do it) but sooner or later, making good on his warranty offer will cost him **something**.
- 4) **Direct Burdened Labor:** Every product manufactured has man or woman power involved; labor for which the manufacturer has paid a per hour or per piece fee. Within the US, the per hour fee must be backed up with social security and other taxes withheld from the employee and matched by the employer. Direct burdened labor means **the direct cost**, per product shipped, for labor **plus** the expense of keeping that employee on the payroll (through matching, tax, and other employee costs or fringe benefits).
- 5) **General and Administrative Overhead:** This is not a slush fund. Every business has an accounting department that includes invoicing, account record keeping, employee management people, sales management personnel, offices to rent or pay for, desks to buy,

electricity to pay for, little league teams to support, travel expenses to pay, trade association dues, outside accountants and lawyers to pay and on and on. Some products, such as those that are mechanical (actuator/controllers for example) may have a larger percentage of each cost dollar apportioned in this area because there are more 'management requirements' and 'problems' associated with the products; more 'customizing' of the products to fit the marketplace.

So now we have the terms defined. And we can see, from **'AT THE OEM LEVEL/ % of each dollar of cost apportioned to areas of cost'** approximately how these cost factors impact upon the OEM (1).

It may surprise you, at this point, to see that with our first 'pie chart' the amount of burdened labor for the receivers is unusually low; when compared to the antennas and other parts.

WORLDwide

There are no real secrets in the electronics end of this business anymore. A manufacturer in Boston or Winnipeg can look at an LNA or receiver or BDC receiver, for example, and tell you within 1 to 2% what that product costs to make, **no matter where it was manufactured**. There is something called a 'universal bill of materials' and unless you are an adventuresome manufacturer such as **Hytex**, your bill of materials for an LNA 'here' will not differ widely from a bill of materials for an LNA made in Japan.

In our **July 15th CSD/2**, M/A-Com's **Jim Bunker** noted: **"There is a fundamental bill of materials which goes into any product. This bill of materials is no different offshore than onshore."**

Anderson Scientific's **Mark Anderson**, in an interview to appear on **Boresight** and **Satellite Showtime** later this fall, suggests:

"I can buy parts for as little as a Tokyo or Taipei supplier; parts sourcing is now worldwide. There are no long term advantages to being offshore in buying parts. We routinely source parts all over the world and if we can buy resistors for 0.9 cents each, we are paying the same thing as say Uniden."

Which brings us back, just to example, to the **burdened labor cost** for a product; that direct cost of labor which went into the product, regardless of where it may have been assembled. **Mark Anderson** again:

"We have the total direct labor time in our receivers down to under 1.5 hours. We'll get it down to an hour this year. How much money could I save, really, if I went offshore to get our receivers built? They can't do it any faster than me and even if their labor costs half as much (which I doubt), there is an insignificant dollar savings for Anderson Scientific. Even if the labor was 'free' the burdened cost with one hour of labor per receiver comes in at around \$8 for me here in South Dakota. Take \$8 out of my receiver cost? Not that big a deal, and that's with totally FREE labor!"

SO WHERE Are The Bucks?

We'll concentrate on receivers since they are easier to study and because their pricing seems to be fluctuating

1/ These three 'pie-charts' are intended to be illustrative of the relative differences in the three primary categories of products produced and sold in the TVRO system-world. Percentages are of each dollar of cost in the total product.

(downward) so rapidly these days. Plus, the largest corporate failures in the business recently have been in the receiver area and this is the one product area where dealers get 'stuck' or 'burned' the worst when a company fails because of on-going service and repair problems.

Receivers, as we are about to see, are extraordinarily 'volume conscious'. But not for the reasons you may hear in off-handed comments at the bar in Nashville. It has very little to do with the cost of parts nor the cost of labor at anything greater than 1,000 receivers per month volume. It has to do with **'invisible dollars'**.

Our second **'pie-chart'** looks at the flow of a product from the OEM to the distributor(s) to the dealer(s). We have a chart that starts with the OEM at the bottom, moves to the distributor (middle) and then to the dealer (top). The pricing levels are \$214 'cost' as the receiver leaves the OEM, \$325 'cost' as it leaves the distributor and \$400 'cost' as it **arrives at the dealer**. Now let's break these down without getting too hung up in detail numbers.

- 1) Our OEM has spent \$75 for raw parts, \$38.50 for mechanical parts (cases, knobs, et al) and when he gets done, he has \$214 tied up in each receiver as he ships 1,000 per month. He has to get more than \$214 for each receiver or he loses money. No, \$215 will not cut it.
- 2) Our distributor pays \$325 for the product and on the 'surface' this looks like he is 'giving' \$111 in 'profit' to the manufacturer. We will revisit that \$111 of 'apparent profit' before we get done. The 'example' distributor here is a **real distributor**; he has a warehouse, a sales staff, a service department, a dealer training program, an advertising program and so on. This is not your mythical fellow with spare room in his garage and an 800 number line. Out of the \$325 he pays, we see that the OEM's **cost percentages** now change; for example, what was an original 35% product cost 'share' apportioned to 'raw parts' (\$75) is still \$75 but now it amounts to **23%** of \$325 rather than **35%** of \$214. We'll come back to this because it is important later on.
- 3) The distributor marks the product up, by \$75, and he sells it to the dealer for \$400. Our percentages change again although the original dollars stay the same; **now** our raw electronic parts amount to **19%** of the total product cost, at the dealer 'level'.

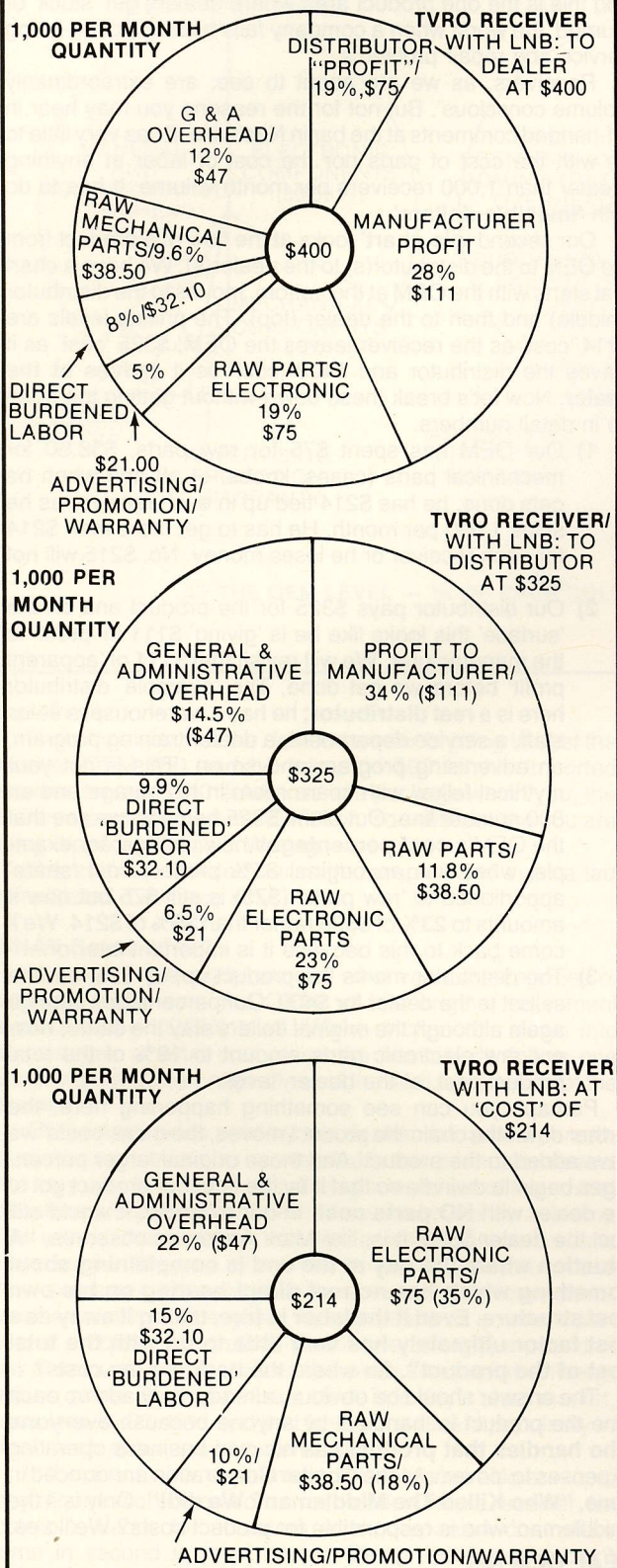
Perhaps you can see something happening here; the further down the chain the product moves, the more 'costs' we have added to the product. And those original larger percentages begin to dwindle so that if by the time our product got to the dealer with **NO parts cost**, in our example, it would still cost the dealer \$325. It is, like Mark Anderson observes, **"A situation where the guy at the end is complaining about something which has no real direct bearing on his own cost structure. Even if the labor is free, taking it away as a cost factor ultimately has very little to do with the total cost of the product"**. So where the heck are the costs?

The answer should be obvious, already; they add up each time the product is 'handled' by anyone because **everyone who handles that product** has his own business operating expenses to 'cover'. As the Conifer Corporation announced in June, **"Who Killed The Middleman? We did!"**. Only is it the 'middleman' who is responsible for product costs? We'll see.

REAL OEM Net

Possibly sticking in your 'crawl' at this point in 'TVRO Economics 101A' is that \$111 we have assigned to OEM profit in our receiver example (remember, these are only examples!).

AT 1,000 UNITS PER MONTH/WHAT HAPPENS TO PRODUCT 'PROFIT FLOW' AND COST FACTORS?



You have perhaps already done some quick math and you see \$111 times 1,000 each month and you now know why each time you see that receiver OEM at a trade show, he is getting out of a rented Lincoln.

\$111 profit? No way.

In our **third pie-chart** we see where that \$111 goes. You probably figure that after we walked through the first and second pie-charts, we have **all** of the OEMs costs covered; that the \$111 in our example is spending money for the Lincoln plus a townhouse in Florida. Not quite.

First of all, receiver designs do not fall out of thin air. Let's follow the closest thing to thin air we can identify within our industry; a 'smart fellow' buys a Drake 340 receiver, tucks it under his arm, and buys an airplane ticket for Taipei. There he hopes to hand the receiver, and perhaps a schematic, to some electronics house and ask for a 'quote' on 1,000 per month; "just like this, except . . .". That sounds like no engineering time and therefore no engineering expense, right?

It is pretty close. But there is a considerable price to be paid for being a 'copy-cat'. **There is time**; six months or more while the copiers are taking the circuits apart, making drawings, figuring out how they will 'copy it' closely enough that it will work like the original; they hope! In that six months Drake (in our example) finds a dozen better ways to do things; and they bring out better models. So when the copy-cat receiver is finally ready for production, it is a generation or two behind the original that was copied. All of this will become painfully evident to the 'entrepreneur' when he finally gets delivery of his product (**perhaps 9 months after he first flew to Taipei**) and starts to bring in his 'revolutionary, new receiver'. He will be cheaper, alright, than the Drake he copied. But he will also not be as good.

How can he be cheaper if he has copied it **exactly** and the parts cost the same in Taipei as in Miamisburg? Even if the labor is the same in both areas (Drake has become very nearly automated to compete), the copier has no original R and D or engineering in the product. In our third chart, we see that in our example the OEM has **\$222,000 invested in the product's design**. He hopes to recover that original cost, which is mostly in engineering time and more engineering time, by turning out 10,000 of these receivers. If he can sell 10,000, as he hopes, before he is forced by receiver competition to upgrade his design, he will have \$222,000 divided by 10,000 receivers or \$22 per receiver in R and D.

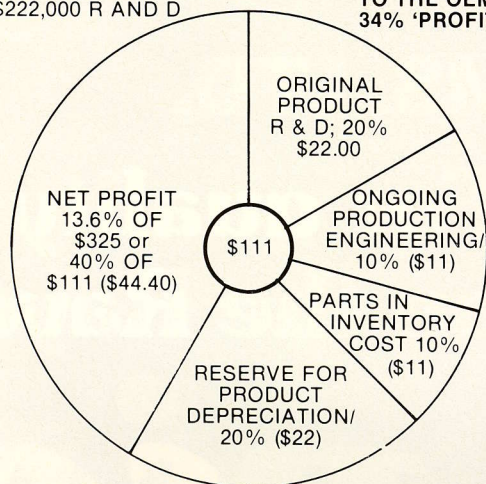
So our \$111 'profit' just went down by **\$22 per receiver** because the receiver OEM will have to 'lay off' \$22 per receiver for 10,000 receivers to get his developmental costs back.

The 'profit-drain' plot thickens.

No product is ever mature; even if you think it is. Every product has in-production changes as the production lines are flowing. **For example**, a particular transistor is chosen for the video amplifier. Right in the middle of a production run, the transistor supplier burps and fails to deliver 500 as scheduled. So there sit 500 receivers with no video amplifier transistors in them. The OEM has plenty of bucks tied up in those 99% completed receivers and for a **40 cent transistor** he cannot ship the receivers. Distributors and dealers are screaming. The accounting department is screaming about an upcoming payroll. Those 500 receivers **MUST** be shipped!

In rushes a production engineer who makes some quick calculations and then he suggests a replacement transistor. The parts buying guy or gal goes to work looking for 500 of the specified replacement; overnight, via FED-X. The parts are found, but they cost **\$1.50 each** rather than 40 cents because they are bought on the open market without advance schedul-

WHAT IS 'REAL' OEM 'NET' FROM
\$111 PER-UNIT 'INDICATED' GROSS PROFIT?
*FUNCTION OF ULTIMATE
VOLUME: 10,000 UNITS IS
\$222,000 R AND D



THE OEM'S SHARE QUICKLY THINS DOWN TO A 'NET' OF 13.6% IN OUR EXAMPLE ON THE ORIGINAL \$325 PROVIDED HE CAN MAINTAIN CONTROL OF HIS ESTABLISHED WHOLESALE PRICE TO DISTRIBUTORS AND REACH HIS R & D PRODUCTION QUANTITY WRITE-OFF GOAL OF 10,000 UNITS AS CITED HERE.

ing. After a five-day delay, costing big bucks in the cash flow or dollars available-to-spend department, the receivers finally get out the door. But only after the production people have to go back and re-work the 500 receivers by adding one resistor and changing one capacitor to accommodate the substitute transistor located. It all adds up and for every product leaving the factory, there is an on-going production engineering cost; even if a particular batch of 500 get out without changes, the next batch of 500 will get hit.

And you wonder why your schematic diagrams are not always accurate!

Then there is a **parts-in-inventory** cost. To avoid as many of the production engineering problems and costs as possible, the manufacturer has to schedule ahead, buy ahead and receive ahead his raw parts. The parts he plans to use in March are ordered **the prior November** and scheduled for delivery in **January or February**; just to be certain they are there when needed. That means the supplier may have two or **three or even four months** stock of 'key parts' in inventory at any point in time. On 30 or 45 day terms with his parts suppliers, **the OEM has dollars invested in raw parts inventory**; dollars which will not 'turn' that month because those parts may not get used for 60 days or more.

Those dollars cost money to have tied up; they are dollars that are not producing revenue, at **that point** in time. They are dollars on which interest is being paid. And that interest and the loss of those dollars from '30-day-working-capital' costs bucks. A 10% 'cost for parts in inventory' could also be labeled as a 'X% increase in raw parts cost'. **It adds more bucks to the REAL cost per receiver.**

And then we have something called '**reserve**'; or the putting away of some of those original 'profit' dollars for that eventual day when there will no longer be a \$111 'profit' in

each model of that receiver shipped. How does that happen?

Every receiver design has a limited 'shelf life'; a limited period of time during which the receiver can be competitive, at the established price. The longer you build the unit, without major changes, the closer some competitor comes to offering the same features as you with the same or better reliability and quality for \$50 or \$100 less. **You know this**; and you also hope that you can get your 10,000 receivers shipped and paid for **before** this happens to you. But maybe you won't be that fortunate. Maybe you will lose a month or two between original design and shipping the first batch of receivers because you can't get the parts required when you first need them. Each month lost is a month during which somebody is scheming and conniving to bring out a better product for fewer dollars.

At some point you know you will have to 'discount' the product, to phase it out in favor of a newer model. Just as a competitor is learning from you how you did it and is scheming to bring the costs down, you too are learning and planning your next (and next!) versions. And down the road, you see a day when rather than getting \$325 from the distributor (the customer for the OEM) you may have to drop the price to say \$275 or even \$250 just to clear out the production lines and warehouse. So you cannot plan to get the **full profit margin** of \$111 for each receiver for the **full 10,000**; because just as sure as you do, and plan a tight budget based upon that premise, somebody will jump up and get you just as you are turning out your 7,000th unit. Ooops.

So '**reserve for depreciation**' is a hedge on discounting; you **plan** that it will happen, and **if** by some miracle you struggle through the full 10,000 you originally planned, to depreciate your original R and D costs, and you are **still getting the full \$325** from distributors for your product, well . . . you smile a lot.

That original \$111 of 'profit'? In our pie-chart we see it has now become \$44.40 or **13.6%** rather than the original 'apparent net profit' of **34%**. My, how money flies away when we are having fun!

MANUFACTURER In Trouble

By now you have already spotted several areas, 'assumptions' made by the manufacturer **before** he started initial production on a specific model, where the OEM could get himself into real hot water; in a hurry. Our fourth '**pie-chart**' spells it out.

The first and most obvious potential problem occurs in the 'writing off' of the initial R and D costs. Remember that \$222,000 going into the design of the 'original' product? Remember that our OEM planned to build 10,000 of these receivers and to 'lay off' or 'amortize' that investment at \$22 per receiver. Now let's suppose that for whatever market-related reason, the receiver does not run 10,000 units. Remember we had a depreciation reserve of \$22 per receiver 'just in case'. But supposed the projected 10,000 production run is way off; so far off that \$22 per receiver, in reserve, does not cover the change in pricing?

In our example, our OEM slips from a projected production of 1,000 per month for 10 months to 500 receivers per month for 10 months. His cost of each receiver **just went up by \$22**; he had budgeted \$22 for R and D per receiver and now he makes only half as many receivers so his R and D just doubled, per receiver. Will reserve for depreciation cover that change? Yes, on the surface; no, in reality as we shall see.

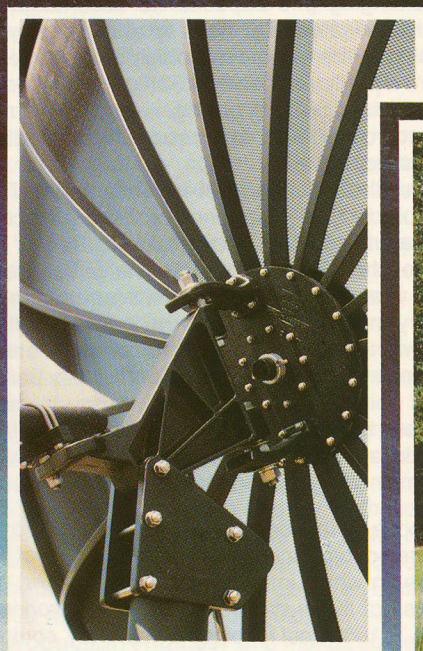
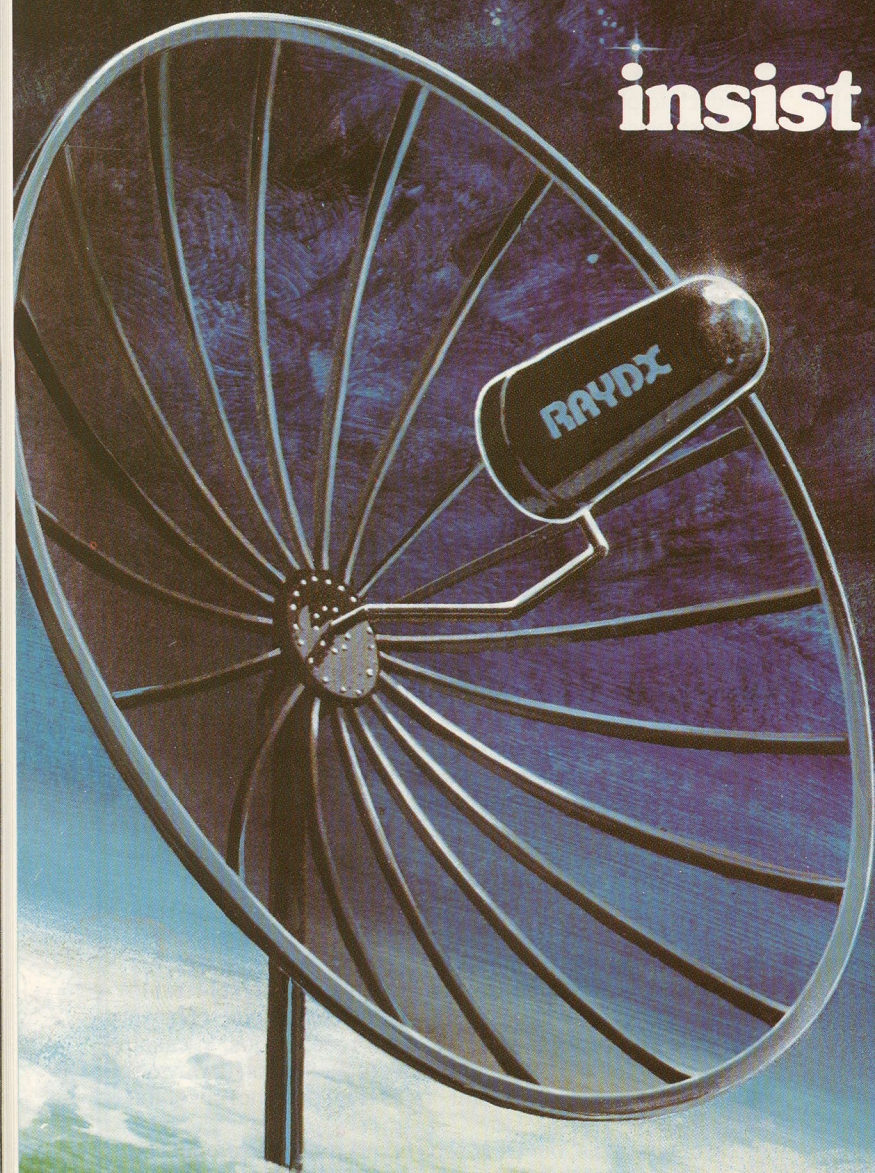
His on-going production engineering is left alone (\$11 per receiver) but a tragic thing happens to his parts in inventory

RAYDXTM

SATELLITE SYSTEMS, LTD.

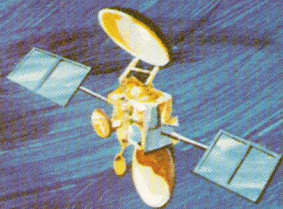
**For quality and
insist on the RaydishTM**

***pictu
per***



dependability,
by Raydx™

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rfect



OUR ANTENNA CHANGED THE LOOK OF THE WHOLE TVRO INDUSTRY

Since Raydx created the 10.5' Raydish™ Antenna, a wave of look-alikes have rushed to market.

But Raydx, and only Raydx, offers the finest quality aluminum mesh antenna available today. With all the outstanding features necessary for years of dependable service:

Heat treated aluminum construction (Stronger than structural steel), high performance, environmentally compatible see-through design, stainless steel hardware and durable long life finish.

Raydx sells more custom-crafted mesh antennas than all the copies combined!

So, don't be fooled by look-alikes (*and there are many*). Insist on the best, the original, the 10.5', 8.5', and 6' expandable Raydx antennas. After all, anyone can copy an original design, but only Raydx can deliver the quality on-time every time.

Go with the leader...

RAYDX™

SATELLITE SYSTEMS, LTD.

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(904) 687-2003

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SPACE
SOCIETY FOR PRIVATE AND COMMERCIAL EARTH STATIONS
The Voice of the Satellite Earth Station Industry

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PATENT PENDING

TVRO 101A/ continued from page 17

costs. **Lead time.** You don't run down to the local Radio Shack (more than once) and buy out all of their power transformers to build receivers. You spend weeks, months, shopping all over the world for parts, scheduling orders and deliveries for those parts, and arranging credit terms you can live with. **To cancel an order**, or reduce an order by cutting the quantity ordered in half, **will cost you money.** Potentially big bucks because when you ordered 1,000 power transformers per month from a supplier in Seattle who in turn is buying them from a factory in Manila, all sorts of planning went into effect. The guy in Manila ordered cores and wire and scheduled help to fill your order. The guy in Seattle issued a letter of credit to the guy in Manila to cover the 1,000 per month transformer delivery. Now you call up one day and casually 'request' that the order be cut in half 'for a few months'. It will be, but **your cost per piece just went up**, all at once, because the guy in Seattle and the plant in Manila have to pay their own losses off.

In many cases, you can't shut down the supply lines rapidly; you will often get shipped a month or two at the 1,000 level before the shipments reduce to your requested 500 per month. And all of this extra inventory costs you money; it adds considerably to your 'parts in inventory costs'; maybe as much, as we show in our fourth pie-chart, as \$33 per receiver. That's double (for reducing to half the original order and therefore getting a higher per-unit [transformer] cost) **and double again** because now you have a bunch of unplanned dollars invested in an overstocked inventory; rather than carrying 45 to 60 days of raw parts inventory, you end up with 90 to 120 days of raw parts because you could not turn off the raw parts faucet fast enough.

Humm.

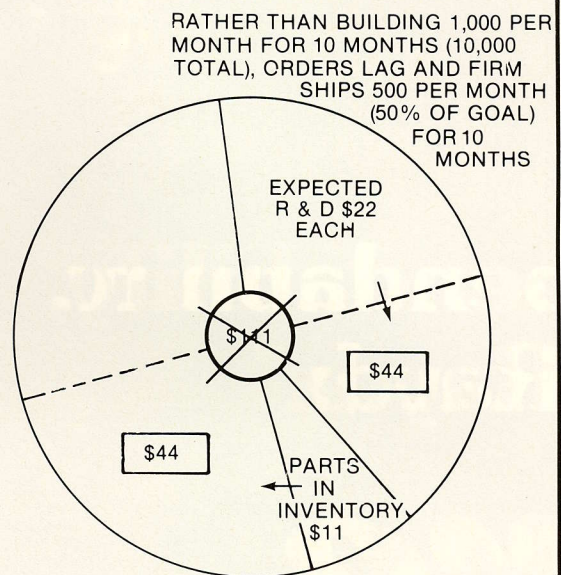
Between the doubling of the R and D cost (by cutting in half the total production run, abruptly) and doubling the parts in inventory, you just added **\$55 to each receiver** going out the door. Do you remember what our REAL profit was, at the 'end' of the third pie-chart? Not \$111 per receiver; but, **\$44.40** per receiver.

To that \$44 per receiver NET profit we just tacked on \$55 additional **cost** per receiver because we slipped from 1,000 per month to 500 per month. What about the original \$22 we set aside to cover depreciation of value? Won't that put us back in the profit margin? **Only if** in the midst of this cut-back chaos somebody does not come along with a newer receiver that costs less and does more.

NUMBERS/ Yes

So an OEM can get in trouble, in a hurry, if:

- 1) His original projection for receiver volume **falls short**, or,
- 2) He cannot create sales sufficient to support his pre-ordered raw parts inventory and has to **cut back** at a

HOW AN OEM GETS INTO TROUBLE

- A) R & D COST PER UNIT NOW BECOMES \$44 PER UNIT RATHER THAN \$22
- B) PARTS IN INVENTORY, AN ESPECIALLY DANGEROUS AREA, COSTS MAY QUADRUPLE TO \$44 EACH (RATHER THAN \$11)

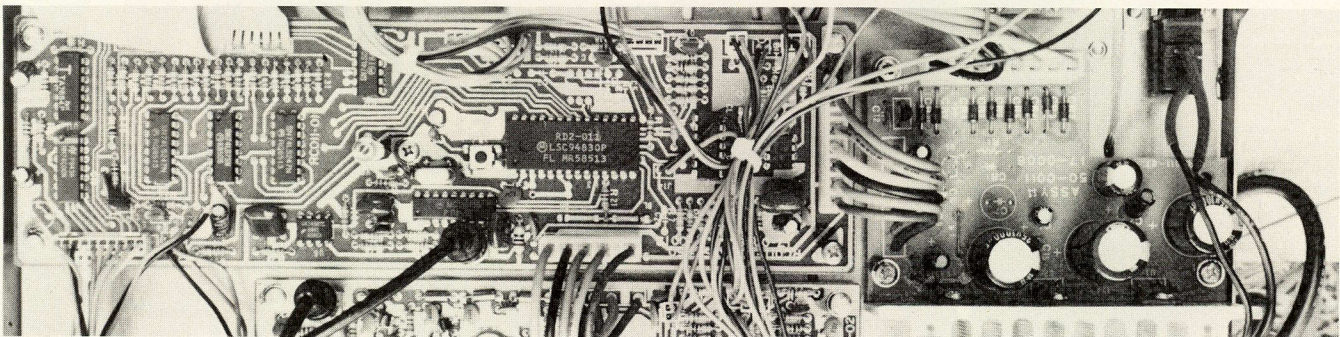
PROFITS ARE NOW REDUCED BY \$22 + \$33 OR \$55 PER UNIT. AT 1,000 PER MONTH, NET PROFIT WAS \$44.40 PER RECEIVER. AT 500 PER MONTH, THERE IS NOW A NET **LOSS** OF \$11 PER UNIT SHIPPED: ON 500 UNITS, COMPANY LOSES \$5,500 PER MONTH OR \$55,000 IN 10 MONTHS (EXCLUSIVE OF ADDITIONAL LOSSES IN PROMOTIONAL COSTS).

dollar penalty, or,

- 3) Somebody pops out 'early' with a better, cheaper model **before** he has retired his original costs.

He can also get in trouble if he does several other unfortunate things. Such as announcing a new receiver for delivery in March and then failing to deliver until May. He compounds his problems here if his new receiver is designed to replace an older, out-moded version (which may still be selling reasonably well) and he phases out the still-selling model **before** his new model is actually being shipped. Yes, he could go several months **with nothing to ship** and that is an almost certain disaster.

Where does the distributor fit into this scenario? Can he get hurt, badly, when an OEM slips and falls? We'll look at the distributor's own problems in CSD/2 for September 15th.



JAPAN'S BEST (PART 3 OF 4)

DX



WORLD Class Excitement

Japanese high tech firms are a legend to themselves; and they all fit the same mold. Quiet, conservative, anxious 'not-to-offend', their personnel always stand quietly off to the side, observing but seldom participating.

DX Communications, Inc., a subsidiary of C. Itoh & Company (America), Inc., is a Japanese high tech firm. C. Itoh, one of Japan's largest 'trading firms', is into virtually everything. Most recently, they have become a partner in the ownership and operation of the first Japanese domestic satellites (see **CSD**, Transponder Watch, **August 01**; page 66) with 40% of the mammoth project under their wing. C. Itoh, in America, has been most evident through their DX 'Antenna' subsidiary. The firm started out early at TVRO trade shows, displaying early TVRO equipment and then eventually their 640-family of commercial grade (SMATV and cable) rack mounting receivers. Characteristically, they stayed 'in the background' and you almost had to trip over DX to realize it was there.

Industry pundit **Peter Sutro** (MTI Satellite) was the first to recognize their abilities; promoting the DX SMATV receivers, Sutro played a major role as a distributor and an activist on their behalf to increase their exposure level. But the real change in DX was happening in Japan where engineers and designers were carefully analyzing the TVRO receiver marketplace early in 1984 to determine whether a 'consumer receiver' from the firm might carve out a 'small niche'. DX did several things in advance of bringing out their DSB-600 receiver just one year ago which would ultimately play a major role in the market place acceptance of the product:

- 1) DX spent an uncommon amount of time and dollars analyzing just how the threat of scrambling might eventually impact on receiver designs. Long before M/A-Com would announce their own 'receiver descrambler interface requirements', DX had figured out that interfacing on their own.

This allowed DX to be **first in the marketplace** with a receiver which had all of the appropriate descrambler interfacing switches, connectors and designs. While other receiver creators would be hustling in the fall of 1984 to convert their receivers to 'descrambler compatibility', the DX receivers were already 'there'.

- 2) DX led the Japanese pack in re-analyzing the base-band video performance of TVRO receivers and fine tuning the designs so that every last ounce of **video high fidelity** was recovered from the incoming satellite waveform.

DX, perhaps from their experience with the 640-family of

SMATV receivers, already knew what it took to make good-looking pictures, free of jitter and trash. But the circuits in the 642 and 643 receivers, intended to make the video unusually sharp and stable, cost big bucks. DX gambled that if they transferred those circuits to a new consumer level receiver, that the volume of consumer receivers ultimately sold would cover the added costs. They were right.

- 3) DX re-looked at the remote control functions required and came to the conclusion that no middle or top-end receivers were going to sell well in the marketplace **unless the receivers were packaged with controllers**. But the controller technology was fast changing and the service calls on controllers has usually exceeded the service calls for receivers proper. How do you get the benefits of a controller that packages with a receiver, without creating a servicing network nightmare?

DX found the answer stateside, going to **MTI** for the manufacture of a controller system. The styling would, of course, be an exact match for the DSB-700 receiver which it was intended to sell with. And because another manufacturer had already been to MTI with a similar problem (1), DX avoided the start-up problems normally associated with any new controller package.

- 4) But most of all, DX restudied their marketing thrust. Armed with equipment that worked as well as any and better than most (to coin a phrase), and the manufacturing skills to build an almost infinite number of such product-units, the next trick was to get orders for the product.

Initially, this turned out not to be a problem; the receivers (DSB-600 at first, followed by the virtually identical internally but more bells and whistles equipped DSB-700, later) worked so well, and were priced so fairly in dealer minds that a back-order situation was created instantly. But sustaining that 'sales roll' would take clever salesmanship and a recognition that the performance and pricing features attracting dealers to DX would be duplicated if not actually copied by others within a year. A new marketing 'hook' was needed.

As we visited in **CSD** for August 1st, DX found that marketing hook in the person of **J. Richard Gonzalez** who brought to the usually quiet, reserved Japanese high tech firm an enthusiasm and flair for marketing which few Japanese can match. The marriage seemed made in heaven; DX would build the

BEST OF JAPAN/ continues on page 24



Introducing the top-of-the-line line.

No, it's not a misprint. It's a statement of fact.

Because every new receiver in the 1985 Uniden line delivers top-of-the-line performance, regardless of price. It's the kind of performance that's made us the leader in the industry.

Like our UST-5000 for instance. It's the simplest block downconversion unit in our top-of-the-line line, yet it offers your customers all the sophistication of Uniden technology and styling along with features usually found on more expensive receivers.

Like soft-touch controls for easy channel selection, slow/fast channel scan, easy-to-read LED channel display, and skew and audio tune controls. Plus, the most sought-after feature of all: a very affordable price tag.

There's also our UST-6000. An incredibly reliable mid-priced blockdown receiver that offers all the features of the UST-5000 plus convenient handheld wireless remote control and full stereo sound.

Our UST-7000 combines the most sophisticated engineering in the industry with the most advanced convenience features. Like a built-in programmable antenna controller. Easy-to-read LED displays that provide a full range of information at a glance. And a full-function remote control for total 'armchair' operation.

All in all, an incredible array of features, functions and models. All with block downconversion and at competitive prices, making it easy to multiply your profits by selling multi-receiver systems to families with more than one TV.



And we'll be backing our entire top-of-the-line line with the most impressive dealer support package in the entire industry to help you do it.

So contact your local authorized Uniden distributor for more information on our complete line of satellite television systems. Or call toll-free 1-800-582-5360. In Canada call 1-800-663-0296. And start stocking Uniden's top-of-the-line line.

It will do amazing things for your bottom line.

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Win with Uniden in '85.

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© Uniden Corporation of America 1985

products and Gonzalez would create the orders. And it all comes to a head in just days as the **September 7th** edition of **TV GUIDE** magazine appears on tens of thousands of newsstands and in millions of mail boxes coast to coast (see CSD for August 01, page 78).

The Product

Top of the line, the 'best of DX/Japan', consists of a **DSB-700** receiver and a companion **DSB-400** antenna positioner. The DSB-700 is the higher-end version of the original DSB-600 and for all practical applications requiring two or more receivers per antenna system, the two are inter-changeable.

This is, of course, block downconversion design equipment. DX had chosen the 900 (950) to 1400 (1450) MHz 'block' early for their 643/643 series of SMATV receivers. The DSB-50 block downconverter with a stand-alone LNA, selected by the dealer, is the suggested configuration.

The LNB versus LNA **plus** BDC battle has been raging for more than a year. There has been no clear winner to date, perhaps because while the LNB approach is simpler, cleaner, and easier to install, it removes from the dealer that 'option' to attempt to perfect system performance through dealer-selection of the LNA. If there continues to be a trend with dealers who install large volumes of equipment, it would seem that the LNA **plus** BDC approach is **still the favorite**. DX fits that mold nicely although they have demonstrated LNB capabilities with their 12 GHz equipment for several years.

DX wisely foresaw the coming interest in multiple receiver systems, even early in 1984 when the 600 and 700 series receivers were being designed. DX had an edge here because within their SMATV line-up of receivers they already had perfected the accessory parts which make shared BDC systems practical; line amplifiers, power dividers, power blocks, V/H switch selection pieces, and everything else the budding BDC system multiple-receiver installer would require. Dealers tell us that having a full line-up of DX accessories available, through their distributor, is **a major reason** why they support DX as they do.

The specifications for the DSB-50 and DSB-700 receiver package are not that outstanding, if you do a line-for-line comparison with other 'best of industry' products. Example? Well, the noise figure for the DSB-50 block downconverter is spec'd at 17 dB. Other products in this area claim numbers in the 15 dB region; and the noise figure of the downconverter interplays with the amount of LNA gain required (ahead of the BDC), and ultimately, with the graininess of the picture when the system gain (antenna plus feed, LNA) is low, ahead of the BDC. (Receivers using the LNB approach avoid this comparison since the downconverter is buried within the LNB and the 'noise figure' of the conversion stage[s] is buried in the inter-stage coupling of the LNB.)

Yet in spite of not '**sounding** outstanding', dealers will tell you that the pictures are **very good** and **consumer pleasing**. There is a message here for those who would try to emulate the success of DX during the past year.

The 3.7 to 4.2 GHz band is reduced to 900-1400 MHz in the DSB-50. In addition to the 17 dB noise figure spec, the unit has normalized gain of 16 dB. Power for the LNA 'throughputs'

and the BDC draws a nominal 130 mA like most products in this class. The 900-1400 MHz IF signal is transported inside to the single (or multiple) receiver(s) in RG-6/U or high grade RG-59/U cable.

The indoor demodulator is basic but it represents the lessons DX has learned through tens of thousands of 642 and 643 (SMATV grade) receivers over the years. In fact, the 642/643 units actually provided DX with the unique opportunity to 'field-test' the **circuits** long enough for the 'bugs' to be 'de-bugged' before the **first** DSB-600 hit US shores. And that was another distinct 'DX advantage' the firm had in bringing the 600 and 700 units to market.

An example of the 'lessons learned' is found in the 'input attenuator'. With system gain **at** the LNA, **in** the BDC, and **in** the receiver proper, it is possible for an installer to 'overdrive' the 600 or 700 receiver. As other suppliers have learned the hard way (Uniden most recently), **too much gain** can be a painful thing. DX provides an input attenuator on the BDC IF line going into the receiver proper; up to 15 dB of attenuation, constantly variable from 0 dB attenuation, as an installer aid in making the system operate properly with varying gains, grades of LNA and cable lengths from the BDC.

DX DSB-700 Specifications/

Downconverter Unit: Model DSB-50, input 3.7 to 4.2 GHz

Output 900-1400 MHz

LO operates 2800 MHz, ± 5 MHz

Noise figure 17 dB (maximum)

Gain 16 dB nominal

Receiver Unit:

Input Frequency: **900 to 1400 MHz**

Input Impedance: 75 ohms

Noise Figure: **Not specified**

IF Bandwidth: 27 MHz (claimed, not verified)

Threshold: **8 dB CNR claimed** for static video (not measured)

Video:

Output Level: **1 volt peak to peak**

Flatness: Not specified

Clamping: **40 dB minimum** (unclamped output available through switch)

Differential Gain: Not specified

Differential Phase: **Not specified**

Composite Output:

Output Level: **Not specified**

Flatness: 1 volt, from 80 hertz to 8.0 MHz

Audio:

Subcarrier Presets: None (audio is manual tuneable from 4.5 to 8.0 MHz, but must be done at receiver as remote has no audio tuning)

Output Level: .775 volt at 150 kHz peak to peak deviation

Frequency Response: 50 hertz to 15 kHz, **1% distortion** at rated output level

Miscellaneous:

RF Output: Remodulator on VHF channel 3 or 4 (switch selectable); measured at 2,000 microvolts ($+6$ dBmV)

Audio Bandwidth: 300 kHz wide and 150 kHz narrow

Price: \$599.00 dealer net with DSB-50 block downconverter

Source: DX Communications, Inc., 10 Skyline Drive, Hawthorne, New York 10532 (914/347-4040)

User features include:

- 1) Skew control (allows adjustment of 'skew angle')
- 2) Signal strength meter (affected by IF gain control on rear apron)
- 3) Polarization Reverse and Normal (selection between Satcom [et al] and Galaxy [et al] formats)

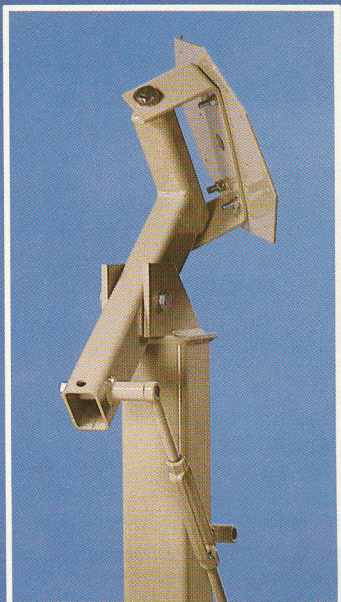
1/. M/A-Com H1 and T1 receivers use essentially the same 'MTI' produced circuit board for their controller packages. A close inspection of the DSB-400 board will reveal jumper wire connections appropriately marked for the **T1** and **H1** products.

Higher Performance

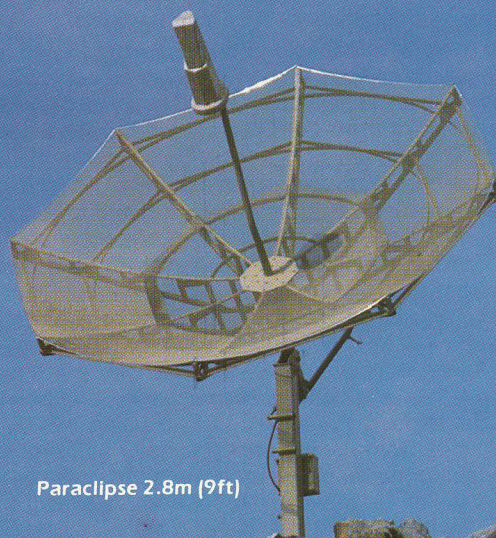
Our brand new polar "T" configuration means greater strength and an increase in polar tracking precision.

We've added oil impregnated, centered bronze bearings and we've increased the mount height for full 0° to 90° elevation adjustments.

The net result is a stronger more precise antenna. After all, higher performance is why you buy Paraclipse.



Paraclipse 3.8m (12ft)



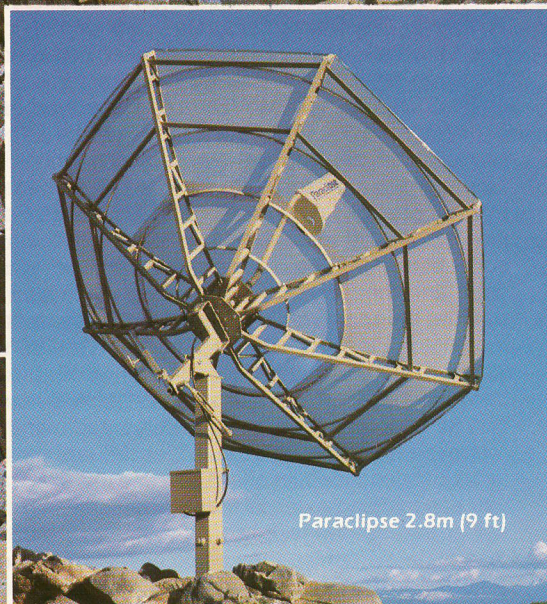
Paraclipse 2.8m (9ft)

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Paraclipse 2.8m (9ft)

Mark Fator photographer

- 4) AFC on and off (allows fine tuning for TI problems)
- 5) Fine tuning (a pair of push buttons that 'step' down [-] and up [+] from the center tuning frequency)
- 6) Channel tuning (another set of push buttons that step through either odd or even transponders)
- 7) Channel odd-even (selects between odd and even transponders after the 'format' has been selected with the polarization normal/reverse buttons)
- 8) Volume (another set of push buttons for louder [+] and softer [-])
- 9) Bandwidth of audio (300 kHz wide, 150 kHz narrow)
- 10) Audio tune control (allows **manual tuning** of audio subcarriers between 4.5 and 8.0 MHz)

The receiver is capable of being adjusted in all of these functions at the unit proper, or, with fewer adjustment options, via the handheld IR unit. The IR unit is standard and it mates as we shall see with the DSB-400 antenna positioner option as well.

DX has chosen to use a second IF of 134 MHz (center frequency; many receivers use 70 MHz) and to support that choice, many manufacturers of TI 'traps' now offer their devices for this frequency range. **However**, the 134 MHz IF is **not brought** to the rear deck of the receiver so the installer can work with traps (easily) when required. (DX plans a change to a **510 MHz IF** [center frequency] in the next 'major run' of these receivers; ESP, for example, will have their popular TI 'filter' available in this frequency range sometime after 1 September. Panasonic is also using this IF at the present time.) Some of the connections or adjustments that **are** brought to the rear panel are worthy of note:

- 1) **Switching Voltage/** Normally, the BDC and LNA receive their operating voltage through the IF input port on the rear of the receiver. This would be +20 VDC. However, DX provides a terminal strip to allow the installer to select a +12/-12 BDC switching voltage **rather than** the BDC voltage for this IF line. In multiple receiver applications, this allows each receiver to independently switch between dedicated vertical and dedicated horizontal LNA + BDC feeds.
- 2) **Decoder Hook-Up/** There are four rear apron points which relate to the inter-connection of an external descrambler. A 'Clamped/Unclamped' switch on the rear apron allows you to unclamp (clamped is normal) the video signal for connection to a descrambler, such as the VC2000E from M/A-Com. A 'baseband output' connector provides the raw video, over the frequency range of 80 hertz to 8.0 MHz for connection to an external descrambler. There are a pair of **baseband inputs**; one for video, one for audio. Like the Panasonic C-2000 unit reviewed on August 15th, the original concept was that an outboard descrambler would decode and then deliver unscrambled video and audio **back to the receiver** for remodulation in the receiver's modulator. Finally, there is a 'Decoder/On-Off' switch which doesn't turn the decoder on nor off. It selects between the receiver's internal demodulated video (audio) for unscrambled signals and the audio and video reapplied back through the 'Video In' and 'Audio In' jacks just described. In effect, you use this switch when you are bringing external video and audio into the receiver through the jacks.

DX has done everything they could have done, given the time frame when this receiver was designed, to make it 'scrambling ready'. In tests conducted by CSD last March, we



PACKAGE/ DSB-700 (bottom) and DSB-400 antenna positioner have been designed to complement one another in spite of their separate heritages.

found the DSB-700 totally compatible, electronically, with the VC2C descrambler unit and so reported in CSD (April 01, 15).

- 3) **Video Level Switch/** Since the DSB-700 can be used with either a 4 GHz LNB, or, LNA plus downconverters, and/or 11/12 GHz LNBs, DX has planned ahead to give you compensation for the two-band video-formats. This switch compensates for what many expect to be a narrower video deviation format at 11/12 GHz than at 4 GHz; a sort of 'video level boost' circuit for the narrower band signals.

As you can see, if you are reasonably familiar with other receiver features, there are some unusual circuits here which make life more agreeable for the installer faced with non-standard installations. In that area, DX spends a significant part of their manual describing a number of typical installations; single band, single feed, or, single band with dual feeds, or dual band with dual feeds. **But the manual, overall, is lacking** in adequate information for an **unexperienced installer**. The DX line of accessories is the most complete in the TVRO world today; if it is an accessory which might be useful for multiple receiver installations, you can get it with a DX label on it. **The basic DSB-700 manual makes no mention and provides no guidance of such systems.** The manual also reads as if it were written for a medium level engineering student rather than the consumer-user. The Panasonic manual, by comparison (see **CSD/2 for August 15th**) is a joy to use and study. Perhaps what this illustrates is that DX, not a consumer electronics company, still has a learning curve ahead if they intend to 'totally' compete with Panasonic and other consumer oriented electronic suppliers.

(DX does provide some loose-leaf sheets which outline in diagram form multiple receiver installation techniques, and most accomplished dealers would have no difficulty following the diagrams. Suitable treatment of the multiple receiver installations, **in text with diagrams**, however would be to the 'DX Advantage' as the market grows into less sophisticated installer levels.)

DSB-400 Antenna Positioner

As previously noted, the antenna positioner accessory, which matches the DX receiver(s) perfectly in styling and size, is of US manufacture. The DSB-400 positioner will 'memorize' the location of 24 separate satellites and with each, the polarization format of the satellite. The package also has a parental 'supervision' function which simply means that someone can lock someone else out of accessing the full 'belt' of satellites. Other features include:

- 1) **10 year memory retention** in the event of power loss (that certainly seems adequate);
- 2) **Compatibility with several sensor systems** including 'hall effect', reed switching, opto (LED) sensors;
- 3) **Alpha-Numeric readout** of the positioning;
- 4) **Polarization 'memory'** including the **skew offset** found on some birds (such as F3R).

The DSB-400 functions in a manner now readily recognized by most dealers; satellites are stored in memory, one at a time, and recalled one at a time. Either the DSB-400 unit or the handheld IR unit accesses the memory and pushing the proper button activates the dish drive to that satellite location. Fine tuning of the satellite location (to compensate for dish drift) is also possible after the drive has gone to the memorized location. A lock-on or parental supervision function allows the dish to be locked on **a single satellite** with the handheld unit, and returned to normal operation with the same handheld unit (i.e. the handheld unit is the 'key' and it must be stored where 'the children' cannot find it!).

SYSTEM Summary

The stand-alone DSB-700 receiver recognized, perhaps before other designs did so, that the basic commodity being sold here is good quality television (programming). The design concentrates on good performance and good reliability. This is the conservative Japanese corporate and engineering mind at

work.

The addition of the DSB-400 programmable actuator changed the gender of the product-package slightly by bringing in bells and whistles which more and more American consumers were asking for in the marketplace.

The marriage of the two appears to be good; for DX and the industry. The DX DSB-700 is not the best satellite television picture you are ever likely to see (any more than the DX 642 and 642 produced the best SMATV pictures you were ever likely to see). But **these are very good pictures** with very good sound; far better in both departments than the average consumer has seen previously.

DX has a roll going here; good engineering, good production, and recently, good marketing. By avoiding the ultimate race for bells and whistles which often only add 'downtime' to a product in the field, DX has found a solid niche not unlike 'the Drake Niche' of 1983 and 1984.

Dealers should be able to package the DX packages with suitably selected quality antennas and quality LNAs to satisfy 90% of their customers who are looking for 'top end performance' at a reasonable price. It may turn out to be a tough combination to beat in the fall selling season.

In **CSD/2 for September 15th**, we'll complete our four-part look at **'The Best of Japan'** with the ultimate bells and whistle machine; the SR-3 from USS/MASPRO.

TVRO RECEIVER OR HOME COMPUTER? GENSAT'S CDR 4/12

It was just over one year ago at the Niagara Falls STTI show that **Gensat** exhibited its Multiple TVRO concept using block downconversion. At that time, Gensat was one of the first companies to exhibit a receiver with built-in actuator control, polarity skew, and stereo. As an indication of how fast this industry has evolved, less than twelve months later, the first

CDR 4/12 rolled off the production line. Also built around the MTVRO principle, the CDR is a completely different animal than its predecessor, but retains many of the design features which has made Gensat a leader with block downconversion.

UNIQUE TUNING WHEEL

In a world filled with many products, each claiming to be "unique," uniqueness is sometimes a matter of degree. Gensat's design team can assert its claim on the word unique in a number of categories. First, **Sam Singer** (Gensat's President) and his design team set out to create **the most** user-friendly full-featured receiver. On that count they have succeeded. The front panel of the CDR features a prominent "thumb-wheel," complete with a notch to insert your finger. The purpose of the thumbwheel is to rapidly access all of the CDR's controls and features. Here's how it works:

The front panel contains a series of buttons, each well-marked for each function, ie. power on/off, audio bandwidth, audio mode, audio subcarrier tuning, volume select, channel select, and satellite select. When you access each mode key, a LED is lit over the function key and a numeric display appears on the front panel. You insert a finger into the rotary dial, and instantly tune up the receiver function.

What's so new about that you ask?

The rotary dial can be turned very quickly because of its weighting and the way you place your finger. You can tune an audio subcarrier all the way from 5.40 to 7.90 MHz in a matter of three seconds. Tuning is fast and accurate. After 'suffering' through receivers with click-stops, or stepped tuning which moves at a snail's pace, or fiddling with undersized knobs, or, tuning mechanisms which resembled a radio dial in a '52 Chevy, Gensat's thumbwheel is a welcome relief.

Did we use the word **unique**? Well, Gensat's infrared remote has to be the winner in that category. The standard remote contains **the same** thumbwheel dial. Sam Singer says **"the thing people hate most about TVRO systems is**

Mark L. Lewis, CSD's 'Man In Canada', is perhaps best known for his 'activist role' in helping create the recently activated **'Satellite Communications Association of Canada'** (SCAC). Lewis is a communications attorney with multi-level experience in virtually all phases of Canadian Communications law. In his 'other life', he is an admitted 'equipment freak' and over the years has reviewed for CSD readers worldwide a number of innovative Canadian-design TVRO products.

by **Mark L. Lewis**
2 Braemore Gardens
Toronto, Ontario
M6G 2C8 Canada

**Introducing
the six-foot dish
that's getting
great reception.
Even from skeptics.**



SpaceMate™ is changing a lot of people's minds about the practicality of a six-foot satellite dish.

Over \$1-million have been invested in the technology behind SpaceMate—and the result is a dish that, with the proper electronics, provides exceptional video reception from any C-band satellite.

SpaceMate has been engineered for convenience. Its seven-piece dish and unique polar mount fit into two compact boxes that simplify storage and are UPS-shippable. Plus SpaceMate's size makes it easier to handle, reducing the man-hours required for installation.

In addition, SpaceMate has been designed for maximum consumer acceptance, with a "see-through" construction and ebony color that reduces its visual impact regardless of the surrounding terrain.

And SpaceMate is available for immediate delivery.

If you're one of those skeptics who thought you'd never be satisfied with the performance of a six-foot dish, why not get more details, or even a free demonstration? Distributors contact THE STOLLE CORPORATION, a subsidiary of Aluminum Company of America, 1501 Michigan Street, P.O. Box 221, Sidney, OH 45365. Phone: 1-800-556-3203



Feedhorn not included.

trying to punch channel numbers into a keypad in the dark, at night." He adds, "So we eliminated most of the keys — you just turn the dial on the remote control, and the satellite receiver will carry out all of the functions." **No argument there Sam**; trying to find the right button on a keypad in the dark is not one of my favorite pastimes. Consumer acceptance of this feature should be 100% positive.

A full-featured **numeric keypad** is also available for the CDR 4/12. The numeric keypad allows parents to "lock out" channels or satellites from the prying eyes and ears of their children. "**The beauty of it**" says Singer, "**is the fact that parents can leave their children with the rotary remote**, and the kids can't circumvent the 'lock out,' not even with the front panel controls. Parents can hide the **numeric keypad**, and use it when **they** watch TVRO, or for programming the receiver."

SATELLITE NAVIGATIONAL SYSTEM

Lest we dwell too long on the remote control, here are some of the other features. The CDR features a fully programmable satellite directory. What's the difference between CDR and other programmed actuators? First, there is a separate front-panel read-out for the satellite position. Rather than using LED's, or partial names for satellites, CDR features a 26 letter alphabet. That means, if Xerox launches a satellite called Xerox some day, you can designate the satellite "Xe!" You also have numerical designation, ie. F3, G1, etc. But best of all, Anik D is "Ad." Now this may not seem like much of an improvement to most TVRO people, but consider your wife or kids trying to match the listings in a program guide to the TVRO positioner. Got the picture? But that's not all. The positioner also **records** a 3-digit position based upon the feedback from the antenna actuator motor. The actuator can be controlled automatically or manually. In 'manual,' you get a position 'read-out' so that you can find the spot again after locating a new satellite. Each time you enter a satellite into memory, it is assigned a 'directory number.' If you want to go from one satellite to another **very quickly**, all you have to do is punch in the satellite **number**. The receiver does the rest. Or you can scroll through the directory and find the satellite you want. All of this may **sound** complicated, but it isn't. It is very simple, and best of all, programming the memory, or altering a satellite name is **very** simple. If that wasn't enough, as the receiver moves from one satellite to another, it **remembers** your favorite **channels**. Rather than stare at a snowy screen for 30 seconds, the receiver **displays** the satellite name as the dish moves, and also displays your favorite channel on **that satellite** with the proper polarity and skew. When it lands on the satellite which you have chosen, the receiver tunes to the last channel which you watched on **that satellite**. There is also a red LED bar graph which simulates dish movement. (This same LED bar graph also doubles as a signal strength meter and is quite accurate). When the dish moves from west to east, the lights move from right to left and vice versa. **We only watch transponder 20 on F2R**. Anytime we go to F2R, the receiver automatically tunes in transponder 20. You can literally tell the receiver to move the dish, go to the kitchen, fix a snack, and when you come back, the receiver will have tuned in your favorite channel. **It's a nice touch**. The CDR is also compatible with most major brands of actuator motors. I hooked it up to a Tracker II, and a Boman actuator without any difficulty. The CDR precisely controlled the Boman actuator.

THE COMPUTER

As you may have already guessed, within the heart of the



CDR 4/12 beats a powerful microprocessor. The receiver only uses 20% (on average) of its microprocessor capacity. So powerful is the CDR microprocessor, says Design Engineer **Steven Mack**, that Gensat will be able to adapt the CDR to changing TVRO transmission standards, new innovations, and new audio formats (possibly including digital audio for VH-1) just by reprogramming some of the "chips." All you will have to do is "pop" out one EPROM, and insert another EPROM. According to Steven Mack and **Mike LaRue**, there are a lot of additional things which could be integrated into the CDR merely by software up-grades. This does **not** mean that the CDR is **lacking** any features. It does mean that Gensat will not have to re-tool or re-invent the receiver 6 months or a year from now. Everything is there, everything is ready! This is a **true** frequency synthesized receiver.

IS IT A TVRO RECEIVER OR A COMPUTER?

While on the topic of computers, consider the following: The CDR has built-in lithium batteries to guard against power outages. That means if the satellite receiver is moved, or power shuts-down, you don't lose all of the memory complete with subcarrier, polarity, and skew settings. The receiver can sit for as long as **5 years** without losing memory.

In the past year, as more manufacturers have built microprocessors into their receivers, many installers have been called back by irate customers after thunderstorms. Many receivers (we won't name any names here) have a tendency to "lock-up" or "crash" after a heavy electrical storm, or power line fluctuations or other types of electrical-magnetic disturbances. Some receivers just 'lose' all of their memory and require reprogramming. With 15 satellites, and dozens of "favorite" transponders, how long would it take to properly reprogram a receiver? Gensat has thought about that problem too! In the case of a heavy electrical storm, the receiver will not "crash." It may become temporarily inoperative, and lock out some features, but an "RE" will be displayed on the front panel. **Hit the "reset" button, and you're back in business!** No reprogramming necessary. Gensat's Singer told of arriving in a Southwestern U.S. city just after a severe thunderstorm. At the distributor's office several other brands of receivers (including some popular off-shore receivers) were showing signs of "heavy weather." The distributor was obviously puzzled by the fact that the CDR receivers were still working. That's the reason.

AUDIO TUNING

The CDR comes with wide, narrow and standard band-

COMPUTER-RECEIVER?/ continues on page 35

L U X O R 9 9 0 0

THE
INTELLIGENT
SATELLITE
TELEVISION
SYSTEM

THE LUXOR 9900 KNOWS

Where all the satellites are

Up to 36 satellite locations can be programmed for instant recall. The antenna controller is integrated into the satellite receiver. The hand-held remote control activates a 3-speed actuator action which precisely locates the satellite and fine tunes the antenna position for maximum signal reception.

Where all the channels are

Every channel on every satellite is individually factory programmed prior to delivery. All audio and video information is ready for recall automatically. As new channels are added they can be added to the program. The 9900 is ready to receive individual channel selection information for up to 864 separate selections.

All about stereo Hi-Fi sound

5 audio modes, factory programmed to individual transponders, deliver the right sound system automatically when a channel is selected. Dozens of audio subcarriers can be added to the program for audio only hi-fi enjoyment (including Dolby® Noise Reduction) in addition to television.

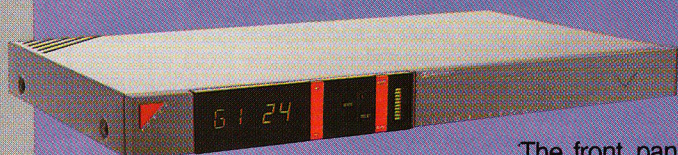


**ALL YOU NEED TO KNOW IS
WHAT SHOW YOU WANT TO WATCH**

L U X O R 9 9 0 0

NOW LUXOR HAS UNIFIED SATELLITE, VIDEO, AUDIO AND COMPUTER TECHNOLOGY IN A SINGLE INTEGRATED HOME SATELLITE TV SYSTEM

So advanced it's as easy to operate as an ordinary TV



The front panel LED display tells you what satellite you're on, what channel you're watching, what sound system you're receiving and a signal bar graph indicates signal strength. All functions are controlled from the hand-held wireless remote.

The sky is alive with the sound of music

Luxor loudspeakers bring new life to TV audio, mono or stereo, and much more. Satellite audio sub-carriers broadcast a wide range of music for audio only. These optional high quality 6-speaker sets (3 per side) are available in passive or active models with sound power up to 40 W per channel. They are specially magnetic shielded for close location to your TV set.



Here is the best of Scandinavian design and high technology. Because Luxor is a leading European manufacturer of satellite products, TV's, audio hi-fi systems, and computers,

the company is able to combine these technologies in the advanced 9900 series. After all, Luxor has been a leader in radio, television and electronic technology since 1923.

Simple, clear and color-coded



The Luxor hand-held remote is clearly organized to make life easy. Distinctive color sections present satellite and channel selection functions, tuning functions and switching functions. For most viewing however, video and audio delivery will be automatic. When a channel is selected, the exclusive Luxor Micro-Step™ Tuning System (LMS) automatically seeks out the right signal within that channel's frequency. The receiver automatically compensates for any form of frequency drift due to climate or transponder variances.

An internal TI filter can be assigned to individual channels to minimize terrestrial interference.

And a discrete parental lock-out can eliminate one or more individual channels on a single satellite, as desired.

That's it. Advanced Luxor technology has produced a system so simple to operate, yet complete enough to satisfy the most fanatic videophile and audiophile. For the technician, the Luxor 9900 even has its own diagnostic system built-in and ready at the touch of a button.

The perfect companion



The Luxor Model 9995 Block Satellite Receiver is designed and built to function as an add-on receiver to Luxor 9900 multiple TV's installations. This low cost manually operated receiver offers independent channel selection for TV's located throughout the house. The 9995 can also be used as a stand-alone receiver for both C-Band and Ku-Band reception.

LUXOR HAS ADVANCED THE STATE-OF-THE-ART TO THE POINT OF ELEGANT SIMPLICITY FOR THE CONSUMER AND THE TECHNICIAN

Each electronic innovation is incorporated to aid ease of operation, assure high performance reliability, and maintain outstanding quality of both picture and sound.



9900 Block Receiver

Control Functions

- + Integrated satellite receiver and antenna controller.
- C-band (4 GHz) and Ku-band (12 GHz) capable. Remote control switchable.
- Satellite direct access.
- Transponder direct access.
- + Built-in A/B switch.
- + "Normal" button return to factory pre-set values.
- Built-in polarizer drive.
- Built-in RF modulator.
- Non-volatile memory unaffected by power outages.
- Remote sensor interface.

Programs

- + Factory programmed for individual transponders on each satellite.
- + Automatic correct audio system factory programmed for each satellite and each transponder.
- + Program capacity up to 864 individual selections, audio video matched and fine tuned.
- + Self-diagnostic microprocessor.
- + LED display of satellite, channel, audio system and signal strength

Video Functions

- + Luxor Micro-Step™ tuning system (LMS).
- Baseband audio and video output for VCR or monitor.
- + Baseband input for other video sources.
- Built-in polarity control.
- + Built-in programmable TI filter.
- Raw video (unfiltered, unclamped) for descrambler connection.

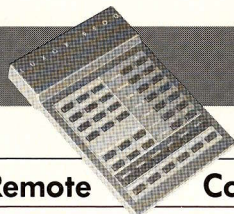
Audio Functions

- + Audio subcarrier frequency read-out.
- Wide/Narrow Bandwidth selection.
- + Remote audio volume control.
- + Remote stereo balance control.
- + Remote Dolby® on/off
- + 5 audio modes—2 mono, 2 matrix, and discrete stereo. Automatic multiplex selection.
- Built-in stereo processor.
- + Direct loudspeaker drive.



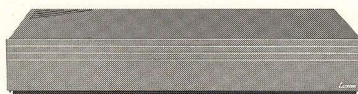
9902 Remote Sensor

- Controls satellite system from any room.
- Low-cost add-on for other TVs.
- Comes complete with hand-held IR remote control.



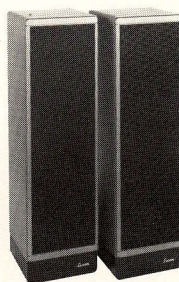
9901 Remote Control

- + Full-function, color-coded IR wireless remote control.
- + Remote ON/OFF
- + Discrete parental lock-out for individual channels.
- + Remote mute.
- + Volume control.
- + Stereo balance.
- Channel UP/Down.
- + Video fine tune.
- + Audio fine tune
- Antenna fine tune.
- Satellite selection.
- Channel selection.
- + Divided into 4 easy-to-read segments: Satellite selection, channel selection, tuning functions, switching functions.



9904 Actuator Interface

- + 36V power supply to antenna drive.
- + Surge protected.
- + Voltage spikes protected.
- + Design coordinated with 9900.
- + Can be wall-mounted out of sight.



9906/9907 Stereo Loudspeakers

- + Passive or active models.
- + Up to 40 W per channel.
- + 3 elements per side; tweeter, mid-range and woofer.
- + Magnetic shielded.
- + Automatic ON/OFF.
- + LED indicators; standby and active.
- + Complete with line cable feed.



9995 Block Satellite Receiver

- + Add-on "slave" to 9900 multiple TV's installations.
- + Can function as a stand-alone block receiver; C-band and Ku-band reception.
- + Manually operated channel selection.
- + Video fine tune. AFC defeat.
- + Built-in V/H switch.
- + Built-in antenna switch for satellite or local reception.
- + Preprogrammed audio frequencies 6.2 and 6.8 MHz.
- + Audio frequency selection 5.0 to 8.0 MHz.
- + Wide/narrow audio bandwidth selection.
- + Raw video output (unclamped, unfiltered) for descrambler connection.
- + External TI filter input.
- + Skew control.
- + Polarizer One control output.
- + Denotes new features available only on 9900 series products.



Luxor High-Performance Microwave Block Downconverters

Designed and constructed for continuous reliable performance, each Luxor unit is individually inspected and tested against all specification requirements. The Block Downconverter (30 dB gain min.) is used in conjunction with an LNA. The LNB Block Downconverter (60 dB gain min.) is an LNA and a Block Downconverter in one compact package. Each unit is weather-tight, rust-proof and fully warranted.

Luxor Sales And Technical Services
Throughout America

1-(800)245-9995

Canada: Evolution Technology (416) 335 4422
Mexico: Klan SA 52 83 789 015

LUXOR®

Luxor (North America) Corp.
600 108th Ave. N.E., Bellevue, WA 98004

width switches, plus mono, matrix and discrete stereo modes. Two independent subcarrier tuners can be set by remote control, or on the front panel. The subcarrier tuning is **very accurate** in steps of .02 MHz. Unlike some other receivers we've tested, 5.56 MHz is 5.56. I'd be less than honest if I didn't reveal that I wasn't totally satisfied with the audio system on the receiver which I was given to test. But here's the story. I was in the plant the day the **first** CDR rolled off the production line. One of the cardinal rules about testing TVRO product is that you try to get a production model, rather than a receiver which has been "tweaked" or specially set up. On day 1, the first receiver was not fitted with a design change in the audio circuitry. Some narrow-band subcarriers did not tune in very loudly. By the time you read this, the problem should have been remedied. LaRue and Mack showed me a 'secret room' where they test the competition. Their improved audio sounds better than the best selling brand, say LaRue and Mack.

Mind you, the first CDR sounds great on MTV and Movie Channel. By the time you read this however, Gensat should have an audiophile's subcarrier receiver.

OTHER FEATURES

The CDR also features a front-panel stereo headphone jack for late-night listening. Best of all, you can control the headphone volume from your chair. The internal audio amplifiers have sufficient power to blast you out of your chair. You can also mute the volume.

There are hook-ups for stereo amplifiers, decoders (we tested Oak Orion [CANCOM] and F.U.N. decoders, and they worked well) as well as a composite video output which can be fed to additional subcarrier tuners, or any other technology which you may possess. All are operational. There is a rear-panel 70 MHz IF loop-through. The receiver works well with most major brands of terrestrial interference (Microwave) filters. The 70 MHz IF is an additional bonus since the least expensive filters are designed for 70 MHz. For those of us who have VCRs, and lots of other equipment, there are 2 AC outlets, one of them switched. Since many TVRO owners have cable or outdoor VHF antennas, there is also a built-in electrical antenna/TVRO switch.

One other thing which I found to be an important feature is the fact that if you use the numeric keypad to change channels you don't have to key in "02" for transponder 2. You key in "2", and the receiver waits for a moment, to ensure that you don't enter any other digits, then it switches to transponder 2. Some receivers require **two digit** entry before they will change channels. Likewise if you switch to the satellite directory mode, or manual acutator mode, the receiver will return to "channel" mode if you fail to make another entry. **In short**, the receiver thinks like a human!

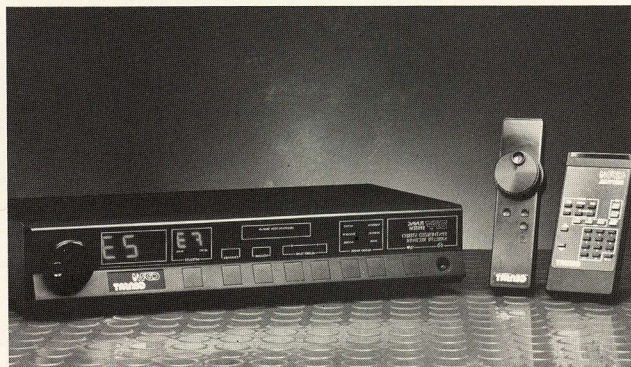
POLARIZER CONTROL

Here again, the folks at GENSAT have done their homework. Some receivers neglect PR-1, or diode polarizers. The CDR has something for everyone, and to set the type of polarizer, you flip a switch at the back of the receiver, and then hit a key on the front panel. It's very simple. That reminds us of the fact that all front-panel controls have double or triple functions. In the **set-up mode**, the volume keyswitch doubles as a "scan" switch, and the audio subcarrier keyswitch doubles as a skew adjust. And, speaking of the skew adjust, the CDR is novel in that field. It will **automatically** set the skew up on each satellite, if you wish. It was very hard to **second guess** the automatic skew setting. We tried the manual skew control, and had trouble improving the picture. By the way, the automatic

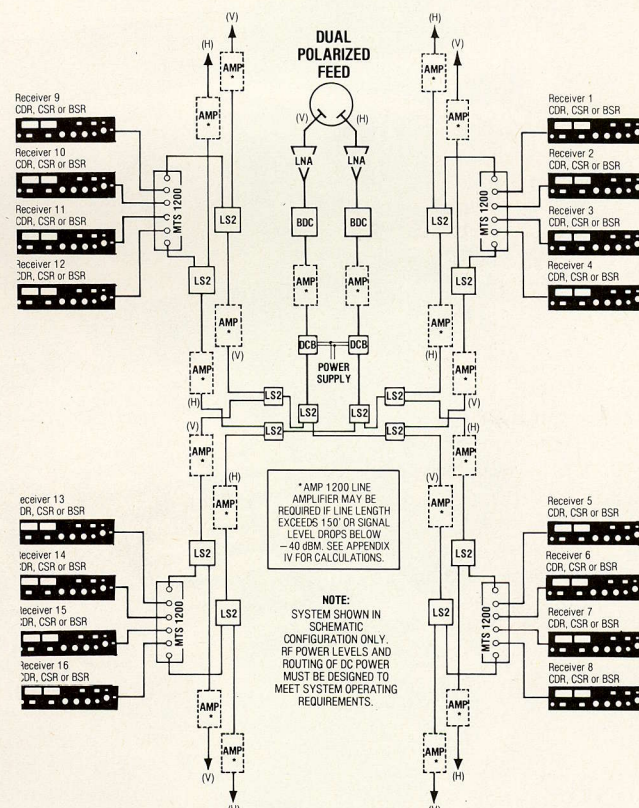
skew control even worked well despite terrestrial interference. This is a **smart** receiver!

VIDEO QUALITY

A receiver lives or dies on the basis of video quality. I am not particularly objective in that department. I have a very keen eye. The CDR passed the test. I was using a brand new Toshiba Digital Flatscreen monitor. This monitor is superior to the new Sony XBR s. The CDR looked good on the monitor. Using the RF output on channel 3, I fed the CDR to 2 TV's about 75 feet away. There was plenty of signal, and the pictures were good.



16 TO 96 RECEIVER COMMERCIAL SYSTEM



TERRESTRIAL INTERFERENCE

I live in an area which is a living nightmare for many receivers. Several transponders were "blotted out" by micro-

COMPUTER-RECEIVER?/ continues on page 38

MAXUM

RC-011S

a good deal
more
for a good deal
less



SINGLE AND BLOCK
CONVERSION

MANUFACTURED BY WESTERN SATELLITE

MAXUM™

008

a good deal
more
for a good deal
less



SINGLE AND BLOCK CONVERSION

WESTERN ENTERTAINMENT SATELLITE TELEVISION, INC. — **DISTRIBUTORS** — ALIA ELECTRONICS — Houston, TX. 713 468-0720; D.H. SATELLITE TV, INC. — Prairie Du Chien, WI. 608 326-6705; Waseca, MN. 507 835-4454; Tifton, GA. 912 382-3867; Buckeye, AZ. 602 386-7131; Mt. Pleasant, PA. 412 547-6160; FINGER LAKES COMM. CO., INC. — Auburn, NY. 800 248-3522; HOOSIER ELECTRONICS, INC. — Terre Haute, IN. 800 457-3330; Overland Park, KS. 800 457-3330; West Sacramento, CA. In state 800 457-3331, out of state 800 457-3330; Orlando, FL. 305 423-4596; Nashville, TN. 615 883-8999; Fort Wayne, IN. 219 483-9514; LEWIS ELECTRONICS — Humboldt, TN. 901 784-2191; NUNN'S ELECTRIC — Lubbock, TX. 806 765-5741; POWER COM INTERNATIONAL — Minneapolis, MN. 612-874-1558; Silver Lake, KS. 913 582-4508; QUARLES SAT SYSTEMS, INC. — Greenwood, SC. 800 845-6952; Headquarters 800 922-9704; QUARLES NORTH — Ashland, KY. 800 228-5761; QUARLES — Alma, GA. 912 632-8723; Charlotte, NC. 704 374-0153; Florence, SC. 803 667-4119; S.R.C. INDUSTRIES — Ontario, OR. 503 889-7261; Wilsonville, OR. 503 682-2467; Kerrville, TX. 512 895-5501; SKY SPAN TECHNOLOGY, INC. — Phenix City, AL. 205 297-7119; U.S.A. COMMUNICATIONS, INC. — Williamsport, PA. 800 233-2303; In state 717-326-7133

MANUFACTURED BY WESTERN SATELLITE

COMPUTER-RECEIVER?/ continued from page 35

wave. With the addition of filters, we were able to get good to excellent pictures on most transponders. The CDR is so stable that once tuned properly, you can **return** to a transponder loaded with TI and the picture will tune properly. **We did find** that with filters which really narrowed the bandwidth, the picture suffered. Colors tended to saturate, and we noted "sparklies" on sharp edges and transitions. Steven Mack explained that the filters eliminated a lot of important **picture information**. What happened to the CDR **would happen** to most other receivers. No surprise. We have substituted brands of TI filters and found to our surprise that some transponders were very clean, at or near studio quality. The key is to have **switchable filters**, and the rule of thumb with microwave filters may be that you have to be very prudent in the selection of your filters. I am doing an evaluation of a number of brands of filters with various receivers. The results will be published in the future.

The good news is that the GENSAT designers are working with IF filters which may be electronically switched in and out as the need arises. No word on when those filters may be built into the CDR receiver, but if and when they go in, this could be the best news dealers in urban areas have had in quite a while.

12 GHZ COMPATIBLE

As the name connotes, the CDR 4/12 is 12 GHz compatible. I attached a General Instrument 12 GHz LNB to the CDR 4/12, and with the receiver in the auto-scan mode, probed my aging solid panel 10-1/2 foot dish. Within 10 minutes we had

located a pair of 12 Gig satellites, including all of the NBC transponders. Although we weren't receiving a perfect signal, because the LNB wasn't really centered, the video quality was very good, without any modifications to the CDR.

THE LAST WORD

It is hard to be critical with a receiver which is loaded with so many features. My pet peeve was the lack of a fine tuning mechanism whereby we could "ease off" the tuning on a few transponders when there was heavy terrestrial microwave. Designer Steve Mack showed me a way to de-tune the receiver in the set-up mode, but this was less than ideal because you detuned the **whole receiver** rather than a specific transponder on a specific satellite. Not to worry, because Mack is working on a software re-write improvement which may solve the fine tuning problem. Once again, I should stress that in a high percentage of all installations, the consumer won't have to worry about heavy microwave interference. In fact, in situations where the TI was moderate, I was able to trap the microwave successfully without detuning the receiver. And, aside from that aspect, there is not much more which I would want to see added to the CDR.

Over the years, I have tried a lot of receivers and my wife has suffered through receivers with **unusual** remote controls, actuator controls, and unfriendly features. She literally cringes each time another receiver is brought into the TV room. The CDR is **easy** to operate. It is the **most user-friendly** receiver used here to date. It also has the simplest remote control. It puts the enjoyment back into TVRO, and from the perspective of the dealer/installer the CDR 4/12 is very easy to set-up.

INDUSTRY AT LARGE

CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

CSD provides this industry 'forum' for the purpose of allowing members of the industry to comment on industry activities. CSD assumes no legal responsibility for statements made here and those providing such communications are held liable for their statements directly. CSD/2, issued on the 15th of each month, provides a forum for differing views on industry trends.

FIRST Timer

For the past 16 years I have been working for Western Union Telegraph Company. Prior to that I taught communications tech control in Vietnam for the army; and like Coop, I spent my younger years building electronic projects. Last summer I read an article in **Radio Electronics** which basically said that everything WU had taught us in 1973 about earth station size was not true. I had to know more so I ordered the **CSD Anthology**. Except for the math formulas, I understood every word. And here was someone telling me about my end of the business (supergroups and baseband processing) which I had never previously seen in print, outside of Western Union. The more I read, the more I realized that what I could offer TVRO was considerable. So I decided to learn enough to become a dealer.

In December, after Western Union mandated a ten percent pay cut, I met with a local dealer and began working with the dealer to assist in high end system installations. By now I have done a dozen Paracclipse 12 and 9 foot assemblies and do this three days every week, in addition to working for WU 4PM to midnight daily.

Voice and data services form the backbone of WU services. For voice services, like the telephone company, WU has used analog transmission (FDM) since the late 50's for long haul circuits. In the early 70's we added TSPAN (or, T carrier) digital systems in major

metropolitan areas. This system involves digitizing voice into 24 channel T1 Digroups. There has always been the problem of cost; T1 was OK for shorthaul and it offered no noise problems. However, on the long-haul circuits we had analog audio and the associated noise problems. Westar inter-connections help but in the end we have to train the customers on 'satellite protocol' and that is not always easily understood. WU will soon be the first to have long-haul T1 systems in place. This will free voice circuits from the noise-floor problem.

Tim Alderman

Analog, or 'conventional' audio systems have always been subject to the nasty cumulative effects of noise. Each 'repeater' or 'processing' station between two points of communication reduces signal to noise ratios and degrades the intelligibility of the transmissions. Bell, in covering the USA with terrestrial microwave links for video and voice, must completely reprocess the analog signals after a specified number of repeater-hops, to attempt restoration of the original signal to noise ratios. The satellite system, because it involves just a single hop, has a minimal effect on this 'noise build-up' problem. Ultimately, that is the single most important reason why there is a viable satellite system in North America.

CORRESPONDENCE/ continues on page 42

**Introducing
a New Member of the
Kaul-Tronics
Family**

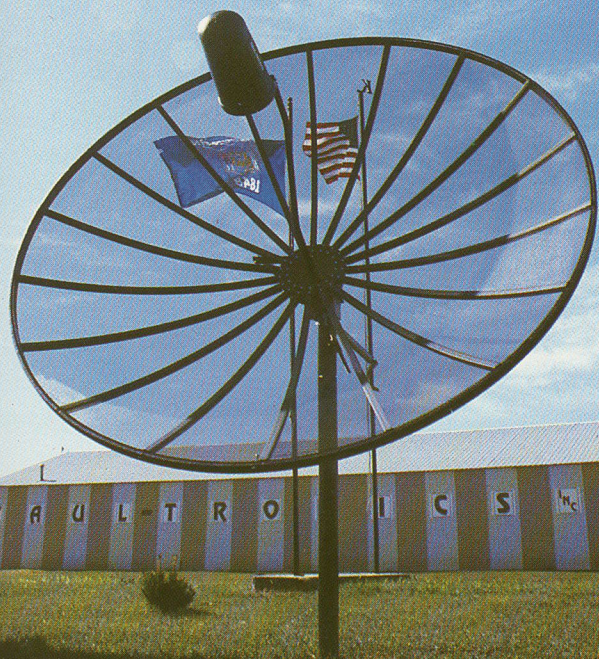
**The Trans-10
(12 rib design)**



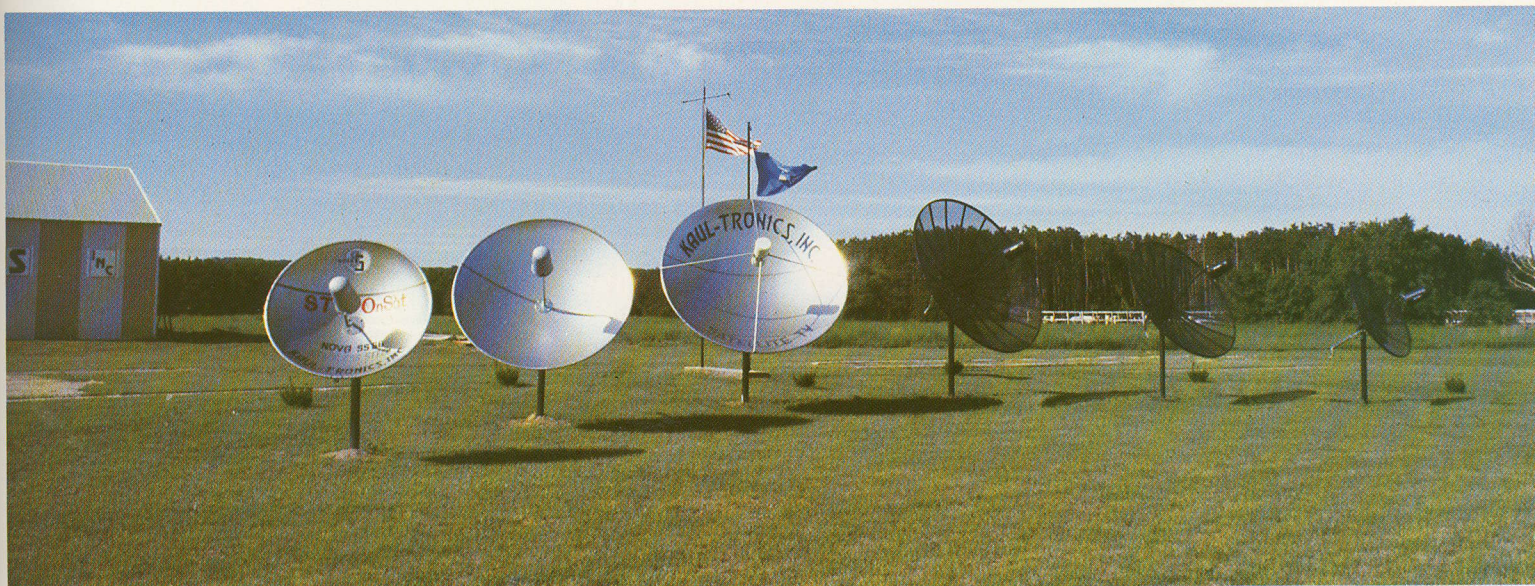
◀ The new family member joins the hot selling Trans-10 (18 rib design) which has already become the premier mesh antenna in America.

The Trans-10 antennas continue the tradition of excellence found in the Nova series of stainless steel antennas.

KAUL-TRONICS:
Quality, Performance,
Best Investment.



f/D RATIO .385-dBi GAIN 40.5



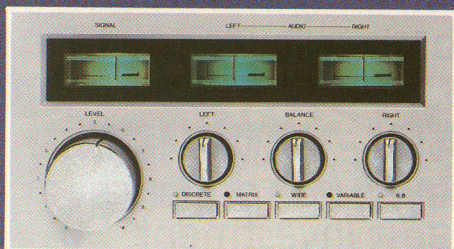
At Last...

INTRODUCING...

*The all new - -
All in One Super
Satellite Stereo
Receiver from
Boman Industries.*

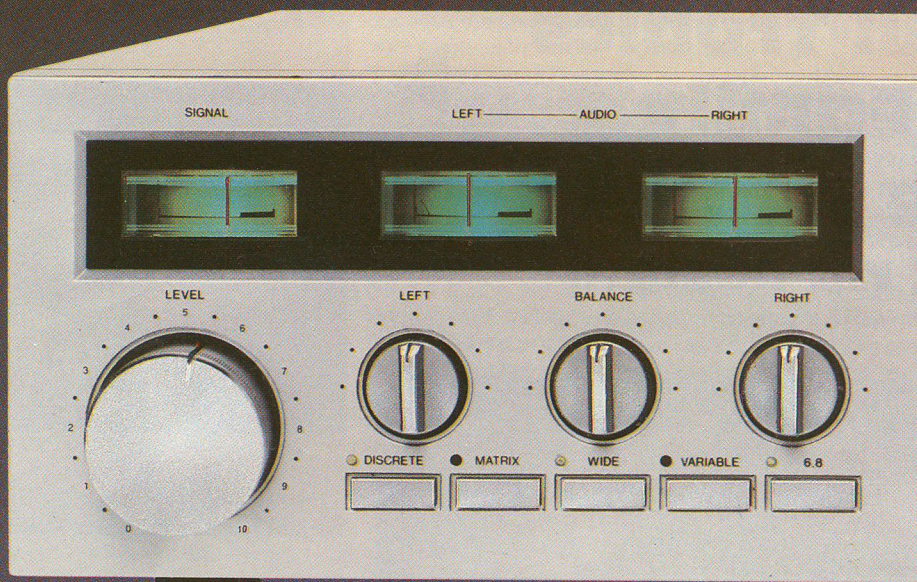
*Convenience and style
combined with the latest in
TVRO technology makes the
Boman Model SR2500 the receiver
to which others will be compared.*

Audio Group



Separate meters showing Signal Strength and Left - Right audio levels are provided with soft green illumination. Left-Right audio channel tuning is adjusted by separate controls. A balance control is provided for attaining that perfect *stereo* effect.

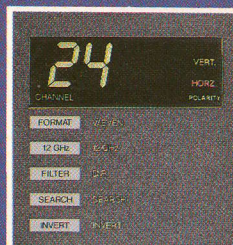
The pushbutton group consists of the "Discrete" and "Matrix" *stereo* buttons. Bandwidth is expanded by use of the "Wide" button. These three controls enhance the reception of all available audio transmissions.



The audio pushbuttons offer a choice of preset 6.8 tuning frequency for most video channels and variable audio for *stereo* or sub-carrier reception.

The Detent Volume control adjusts the volume and adds to the attractive design of the *stereo* section.

Function Group



The attractive display panel shows channel number and polarity position in a soft green color.

The Format button transposes the polarity mode when receiving signals from the few satellites with reversed polarity signals.

The 12 GHz button changes the operation of the SR-2500 from

4 to 12 GHz when used with appropriate 12 GHz hardware.

DNR function provides a filtering of background noise from the audio thus providing very high quality audio performance especially on weaker signals.

A Search button gives a fast scan of all channels and is of assistance during the initial alignment and orientation of the programmable moving control.

The Invert button is provided for reception of inverted video signals.

Satellite Selection Group

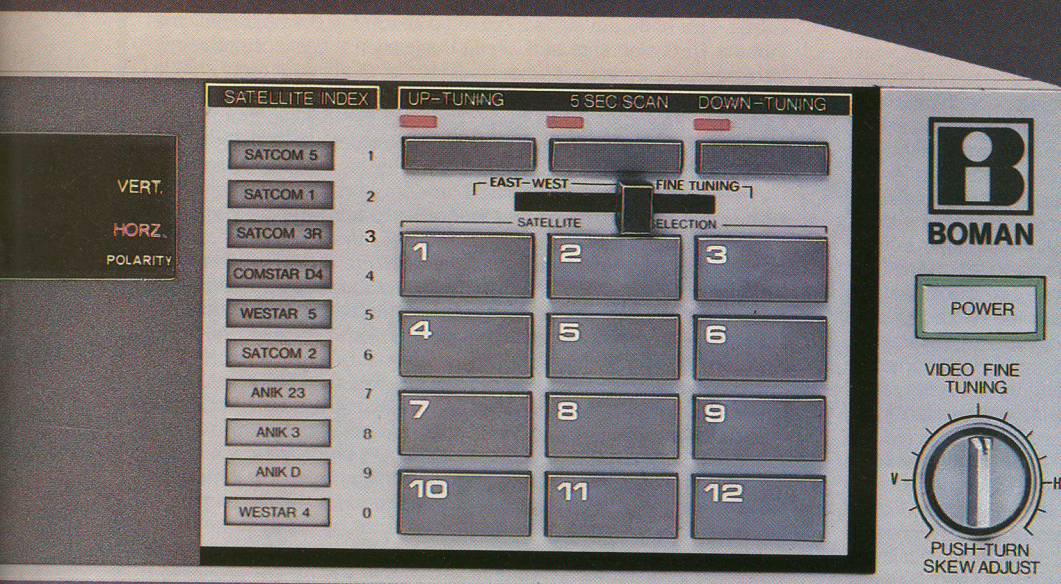


Satellite selection is accomplished with the 12 pushbutton pad.

All In One.

\$389.50

*Down Converter
And
Automatic Actuator
Control
Included*



MODEL SR-2500

The ultimate combination of product innovation, user convenience and

The interfaced control then automatically moves the antenna to the pre-programmed position.

A removable Satellite Index is provided which indicates the selected satellite. Up to 12 different choices of satellites may be illuminated individually. Additional satellite decals are furnished to provide a maximum of 24 satellite variations.

The East/West fine tuning control is used for that extra special antenna peaking which is sometimes required.

The "UP" and "DOWN" tuning buttons provide manual selection or scan of channels in 1 step or 2 step and continuous operation. The 5 second Scan button allows the user to view each channel for 5 seconds during the 24 channel scan.

Video Fine Tuning and Skew adjustment is made quick and easy using the dual function fine tuning control.

Other features found either inside or on the rear panel of the SR-2500 are:

- Automatic Polarity Switching.
- Command Tone Response:
A "Beep" audio tone is heard when any of the Feather-Touch push-buttons is used.
- LNA/Down Converter power remains on when the unit power is switched off: *No more LNA/DC warm-up drift.*
- Integrated Channel 3 - 4 Modulator.
- 1 -2 Step Channel Advance Switch.
- Separate Sub-carrier Outlet.
- IF Gain Control.
- Cable Length Compensation Control.
- Parental Guidance Switch.
- Remote Control Switch.

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CORRESPONDENCE/ continued from page 38

single most important reason **why there is a viable satellite system in North America.**

GOOD Vibes

Some of your comments in **CSD** for July 01 on page 72 made us want to echo your obviously 'good vibes' for Anderson Scientific. Maunaloa Video has been buying Anderson equipment since they hit the market with their ST900 BDC receivers. We have yet to find a defective unit. Their shipping service has been fast and efficient. During telephone contacts to place orders, their staff has always been courteous and knowledgeable.

When our California-based distributor (Transvision) phased out last January, we had to find another source for Cal-Amp LNAs. We wrote to California Amplifier in Camarillo requesting names for their west coast distributors, and some literature. No answer; I wrote again. Still no answer. I had used many of their LNAs, and was happy with them. I had also purchased 200 shares of their stock when they went public. So I cannot 'knock' them; perhaps there is simply a 'hole' in the bottom of their 'in' basket!

We love the free-wheeling editorial style of **CSD** and have been a subscriber since the first issue in October of 1979. We got started in this business by experimenting with equipment; much like Robert Coleman in South Carolina. Our background also includes retirement from RCA Globecom; one of the 'granddaddy firms' in this business. The fledgling industry has come a long ways since 1979; ahead I foresee shaped beam antenna systems including antennas fashioned much in the same way that astronomers build multiple-mirror telescopes with such remarkable results.

Fred Shilzony, Owner
Maunaloa Video
Hawaii

A British research group has created a working 'flat-plate' phased array at 12 GHz; in theory, that should be more cost-challenging and performance-critical than an antenna at 4 GHz. In India, a university has discovered a tree that has a 'conductive bark'; that is, if you 'tap' the bark with a piece of transmission line (or LNA), the tree's bark performs like an antenna and delivers 'RF' to the receiver. Innovative antenna technology will one day replace parabolic designs for many applications. But not tomorrow.

BACK Again

I stopped subscribing to **CSD** when Coop got too big for his britches and headed for the Caribbean. Alas, we need his efforts to protect the dish owners so I am back again.

Frank Sonnek
122 South Roosevelt (#37)
Aberdeen, SD 57401

Welcome back. Coop's britches are indeed bigger than they used to be; two extra inches in the waist since moving to Provo in 1980.

WHAT? Me Worry!

I sincerely believe that the home TVRO owner has nothing to worry about from scrambling. Let us suppose that the cable operators do bludgeon the satellite programmers into wasting billions of hard earned dollars to scramble most of the important programming. Let me tell you what I am quite sure will happen.

As a physicist, most of my professional career has been spent in the U.S. Government financed research laboratories working with a lot of incredibly astute electronic engineers, in laboratories which I suspect would make M/A-Com's facility look like my garage. (Mind you, I have never visited the 'secure' M/A-Com facility in La Jolla but I believe they are no match for the resources that the US Government has poured into facilities such as JPL, Los Alamos or EGG as examples.)

Almost without exception, my bright electronically inclined colleagues have satellite dishes. Should scrambling begin to 'inconvenience' their satellite viewing, they are not the type(s) to sit around wringing their hands. Lights will begin to burn late and long, after normal working hours, and many high powered computers will be

turned loose on the problem.

M/A-Com can insist, as much as they like, that independent decoders cannot be developed; but logic and many colleagues tell me that the DES algorithm and circuit duplication are minor problems. Yankee ingenuity will not be denied. History of amateur radio should convince programmers that the forefront of technology will be in the hands of **interested individuals**; and, you can believe that the 'interest' will be there when they begin monkeying around with the ability of the electronic genius that paid \$4,000 for his satellite system!

I predict many varieties of little black boxes will begin to appear in homes (some good, some bad, but always improving). Remember, this box need not be as complicated as the Linkabit device; there will be no need for individual addressability, no digital functions for accounting and banking, no authorization problems because of high bit error rates, no keyboard functions for on-screen diagnostic prompts, and so on. All it has to do is put the picture right and the audio back on stream.

Information will disseminate like wildfire through the 'underground.' You can be sure that duplication of the device will be pursued overseas, and in Canada and Mexico (really big bucks are at stake here for the 'first-in-the-market' producers). Eventually some entrepreneur will market the device complete with an inscription that reads something like "... **this device is not intended for the illegal reception of . . .**". And it will be all over.

In very short order decoders will be as ubiquitous as police radar detectors or bath-tub gin during prohibition. I think the prohibition analogy is particularly appropriate; black box laws would be as unenforceable in private homes as bath-tub gin was during prohibition. And I am just as sure that many law makers, law enforcers and even judges will avail themselves of these same black boxes within the sanctity of their private homes.

Violations of the Black Box Law will become so pervasive that pressure will mount in Congress to repeal the law; just as prohibition was repealed. The cable companies will have lost the war and the big victims will be the cable programmers who were bludgeoned into spending and wasting billions of dollars. **This note**; I am not encouraging the violation of any law, merely predicting what I feel is inevitable, given recent history.

J. Harry Mortenson
Cygnus Corporation
3930 El Camino Road
Las Vegas, Nevada 89103

Coop recently visited the M/A-Com La Jolla facility. In one room there were 12 'software programmers' busily creating an operations program for HBO to use in addressing individual home systems. He couldn't help but wonder whether one of those employees in that room might one day leave LinkAbit employee and drive 100 miles south to set up shop in Mexico turning out hardware and 'routines' to sell in the underground. LinkAbit has around 1400 employees in La Jolla and while security is quite high, and they claim the plant does around \$100M per year in government encryption work, there is as you say that 'Yankee ingenuity' factor; how do you 'erase' a person's mind-stored data when they leave the facility at night?

FLORIDA Association?

The Florida Satellite Dealer Association being proposed is a darned good idea. But only if the association is made up of and by members for the benefit of the members. At the recent **Precision Satellite** seminar in Clearwater, a gentleman representing this new state association spoke from the podium and generated considerable interest in such an association.

What bothered me was that this gentleman said "I will be appointing myself as temporary president until things get started as we must have someone in Tallahassee to represent us." I am bothered that anyone should **appoint himself** as a leader and I am further concerned that being head-quartered in Tallahassee is the right way to do this.

What this may boil down to is the old argument about where are the first priorities; being **represented** before a state legislature, or, **creating programs** which are designed to help the dealer pull himself up by the bootstraps. As our industry becomes more professional, and

stable and honest dealers emerge, it will be inevitable that a dealer association will form. We need a clearing house for problems, perhaps first, and representation before the legislation at some future date. What do you think?

Ray Gilfert, President
Satellite Video Services
P.O. Box 1307
Lady Lake, Florida 32659

Coop attended the Precision Satellite dealer seminar early in July and spoke on the question of creating a state dealer association. The fellow from Tallahassee was new to us but from our discussions with him, we feel he has the experience to get a credible state association started. Circumstances almost demand that someone (ie. some individual) take the initiative in a situation such as this. Yes, that raises eyebrows from people such as yourself who 'wonder' about the motivations. Is the guy trying to create a 'cushy job' for life? Possibly, but one way to avoid that possibility is to get very involved in the initial formation period and see that the organization is constructed following guidelines which make that impossible. It is always far better to get inside, on the ground floor, of something like this and to try to direct it where you would like to see it go than to merely stand outside being suspicious and refusing to become a part of an effort. Anyone can be suspicious and if we were all suspicious first and involved second, nothing would ever get started. Our advise here is for every dealer in Florida to get behind the effort; if after you work at it awhile there are roadblocks to success, you at least have the benefit of that experience plus the contacts gained by working for that effort to splinter off and do it again without making the first mistakes over again.

QUESTION Answered

When I met Coop at the Tulsa STTI/SPACE show, he asked me

'How do you like this show?.' I had some negative impressions at the time but needed more time to think about them. So here goes.

I liked the large convention facility and the fact that it was not crowded. I liked having the time, without the push of crowds, to really inspect products and really talk with vendors. This does not usually happen. Those were the good features.

I did not like the total lack of facilities close-by to the convention facility. For example, 'nearby' restaurants were not nearby. I brought a motor home and had to drive 11 miles each way to attend the convention because the nearest KOA campground was a distance away. There were no facilities to simply sit and relax or talk with other dealers we had met. The parking facilities at Tulsa were ample but the clearance too low for our motor home(s). We had to park several blocks away and constantly be mindful of returning to the vehicle(s) at intervals to feed the parking meters.

Nashville is always my favorite and as a dealer I have found it a perfect facility and combination of the things I like most. The Nashville facility allows us to bring family and with all of the amusement arcades and restaurants nearby, we never have to worry about leaving the family 'high and dry' while we attend to business. I encourage dealers to come to Nashville, if they attend no other show per year. It is truly the best we have going for our industry.

Dr. Leslie Jones
Webb Satellite Sales
410 S. 1st Street
Marion, Illinois 62959

We all have our favorite shows and reasons why. The Tulsa show was something of an accident in that it happened without much warning and SPACE and STTI had to make do with a far shorter planning period than is normal. There are considerable pressures coming to bear from suppliers who would really prefer a two-show year, so future Tulsa-type shows may be in question anyhow.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

CHINESE have decided not to procure Ku band DBS system after all. Several years of study went into project and 'new plan' would substitute C band for Ku plans. Also possible; Chinese may have learned enough in process of soliciting 'bids' to now build their own system, without 'western' help.

YOUNG Astronaut Program has moved; new address is Suite 800, 1211 Connecticut Avenue NW, Washington, DC 20036; telephone remains 202/682-1985.

PANAMSAT, one of three FCC 'approved' international carriers, has placed order for C plus Ku band bird from RCA and reserved Ariane 4 launch space for next July. Bird tentatively slotted for 57 west and would serve Caribbean, Central and South America with some 'DBS-type-level' signals at boresight on C band. Ownership includes principals involved in SIN; Spanish International Network.

EUROPEASAT DBS proposal receiving serious study after all-European meeting. Launch in 1992, power levels of 100 to 125 watts are proposed. System would include Finland, Sweden, Norway, Denmark, UK, Belgium, Holland, France, Germany, Luxembourg,

Switzerland, Italy and Spain.

NEXT step for three US firms 'approved' by FCC to create non-Intelsat international satellite system is approval by Intelsat itself. Intelsat has battled concept from beginning and is not likely to approve the new carrier services without a fight.

WARC actions on part of USA included plan to expand the bandwidth of the present C band services; from 3.7 to 4.2 GHz downlink to 3.7 to 4.8 GHz. Concept is that additional 600 MHz would be 'held in reserve' for developing nations to use for their own national satellite systems when needed. WARC will continue for another week or two.

DBSA, the recently formed 11/12 GHz or Ku band direct broadcast trade association, has arranged series of tests with NASA Lewis Research Center in Ohio to evaluate the performance under "DBS conditions" of various proprietary scrambling systems. There are four possible systems including one each from M/A-Com, Scientific-Atlanta, General Instrument and Telelease. M/A-Com has said it will

CONTINENTAL™

CX Series

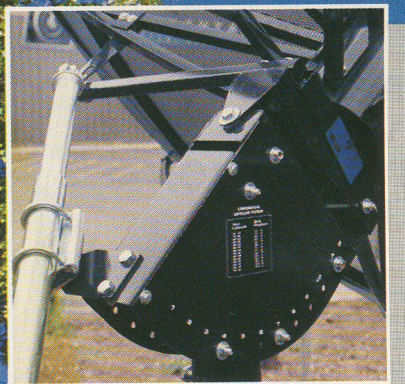
Parabolic Perfection

An exciting new generation of products from the company that gave you the high quality, industry leading, SILVERLINE aluminum mesh antennas. In the same tradition, the gracefully designed CX series, with it's revolutionary preassembled mount still incorporates the CONTINENTAL scissor truss rib support system of high quality aircraft grade aluminum, maximizing strength while maintaining light weight for UPS shippability.

• **CX-75** (7½') • **CX-105** (10½') • **CX-125** (12½')

- Exclusive 10 year warranty.
- Assembles in under 60 minutes.
- Pre-cut, slide in screen for parabolic perfection.
- Attractive powder bake finish assures many years of maintainance free enjoyment. (optional)
- Comprehensive dealer support program.
- Co-Op Advertising.

A stable, pre-assembled mount designed for single-handed installation



TI SHIELD

CONTINENTAL is pleased to announce the availability of a Terrestrial Interference Shield for the CX series of antennas. This shield can significantly reduce the interception of interfering signals by the antenna and will be of particular advantage where block down conversion systems are employed and external filtering techniques cannot be used. Consisting of 8 panels, which are attached to the antenna ribs, allowing convenient installation or removal at any time.

**UPS
Shippable**

CONTINENTAL SATELLITE SYSTEMS

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Clackamas, OR 97015

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*"Designed to perform . . .
Built to last
Backed by pride!"*

**Descrambler
Compatible**

12 GHz and 4 GHz

**Block
Downconversion**



READY YESTERDAY

Both DX DSB-600 and DSB-700 receivers have all the advanced high-quality features you need for great reception and successful installations...now and in the future.

Both are capable of receiving 12 GHz and 4 GHz signals automatically. Both come with video clamp/unclamp switch and composite baseband output for descrambler compatibility. And DX led the industry with quality block downconversion for multiple-

receiver hookup. State-of-the-art features that deliver unsurpassed performance at a low price. From DX, world leader in satellite reception systems... yesterday, today, tomorrow.

DX COMMUNICATIONS, INC.

A Subsidiary of C. Itoh & Co. (America) Inc.
10 Skyline Drive, Hawthorne, NY 10532
(914) 347-4040



TRANSPONDER WATCH/ continued from page 43

not participate in the tests because present Videocipher system is considered 'old technology' by the firm; they would prefer to see tests put off until a new system, now under development, is completed. DBSA is not waiting, will proceed with tests of three remaining systems; tests will run through end of October.

BRITISH participants in DBS project are looking for alternate ways to be involved in satellite 'broadcasting'. When national DBS project 'died', several participants were left with extensive programming plans but no bird(s) to carry their programs.

ARIANESPACE, accused by US interests of creating special satellite launch 'pricing' in favor of European national users, has been 'cleared' of charges by Reagan administration. Some NASA/Shuttle supporters felt Ariane was selling launch space 'below cost' to drive down Shuttle launch pricing.

WHITE House, meanwhile, has established new pricing plan for Shuttle; starting in 1989, most shuttle launches will recover \$74M (in 1982 dollars) through combination of per-user pricing. System will be conducted on an 'auction' basis; each launch will be pre-auctioned off with goal of getting reservations totaling at least \$74M at least \$74M for each flight.

NASA's Beggs says US should be interested in 'joint, cooperative' space efforts with Soviets. Beggs notes that US lags behind Soviets for long-term in-space activities but US leads in sophisticated technology. One possible joint project would be permanently manned colony on Moon or even MARS.

VIEWERS FIRST NATIONAL, a consortium corporation funded by OEM participants in TVRO industry (i.e. Gus Wirth, Rick Brown, James Rothbarth, Bud Ross, others) has signed agreement with Comstar/Telestar delivered 'SelectTV' on behalf of home TVRO viewers. Agreement allows Viewers to 'market' SelectTV to home viewers. SelectTV is controlled by Japanese firm **Clarion** which has provided decoding equipment for terrestrial scrambled service in Los Angeles. Viewers and SelectTV anticipate scrambling the Telstar feed as early as 1986, possibly using Clarion developed scrambling system. Original concept by Viewers was to assure home TVRO viewers that there would be a premium movie service available to consumers even if HBO and other scrambled service plans end up being 'TVRO unfriendly'. Viewers expects to market the SelectTV service largely through home TVRO retailers and to make available the descrambler technology to industry receiver OEMs. Additional channels, including super station carriage, is being studied by Viewers. A major announcement was scheduled in Nashville.

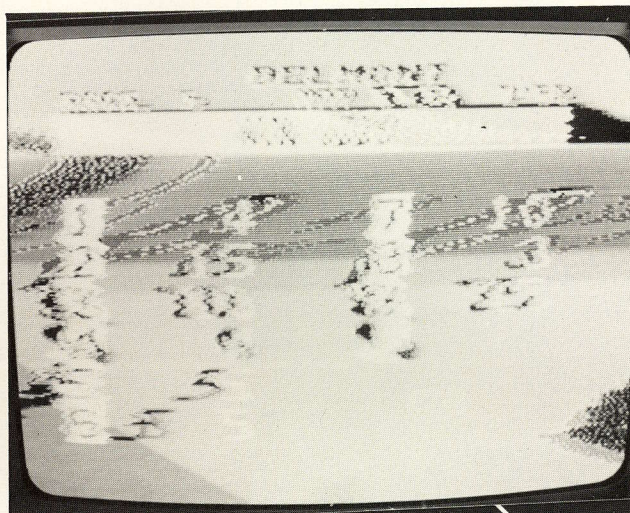
WEST Germany is expected to announce liberalization of 'SMATV' rules shortly. Country is seen reacting to British deregulation of SMATV and home TVRO terminals and if deregulation is as 'complete' as in UK, example will undoubtedly be emulated by other European countries. At stake is possible 'significant market' for SMATV terminals and home TVRO systems.

WINNERS in FCC mandate for uniform 2 degree spacing (see **Coop's Comments** this issue) included Martin Marietta, Comsat and Federal Express (each receiving permission for new Ku birds), Ford Aerospace (winning spots for hybrid C + KU birds) and (RCA) Alascom, American Satellite, GTE Spacenet, Hughes Galaxy, GTE Satellite, RCA Americom, SBS and Western Union. Commission also formalized approval for RCA's KU 1 and 2 birds with **45 watt** transponders (20 watts originally proposed).

ARIANE scheduled to launch Eutelsat 3, GTE Spacenet 3 September 11, followed by pair of European Scientific birds mid-November and GSTAR 2 plus Brasilsat 2 in mid-December.

ITALIAN 'private' TV station/network operators trying to find satellite time and space to allow their programs to be shown throughout Europe. Italian RAI (national network) has working agreement with Eutelsat group, but private interests are frozen out.

TWO American, English language channels are now available in portions of Europe on 4 GHz birds; at 'decent' signal levels. Recently activated Intelsat V bird at 1 west, replacing older IV series satellite, now carries AFRTS 24 hours per day **plus** new **SET-1** (Southern Europe Television), an 18 hour per day channel filled with American soaps and network fare. SET intended for half dozen American bases in Italy but **12 foot dish** and normal electronics produces close-to-threshold pictures in southern UK.



EQUATORIAL Communications micro-terminals now offering complete or partial National Weather Service through firm calling itself Satellite Information Services (301/588-9000).

SOVIETS may have first satellite mobile-tel service in routine operation. '**Morye**' would replace experimental Volna system now operating on Raduga and Gorizont, with 1.636/1.6385 GHz uplink and 1.5345/1.537 GH downlink. Time frame is 1989.

INTELSAT has modified bandwidth for 1/2 transponder video services; from 17/18 MHz to 20 MHz. Difficulties arose when domestic leases of Chile and others could not function properly in 'backed-off' mode with audio subcarrier also present in narrower bandwidth. Change applies to all V and (future) VI series birds.

BANKERS Television Network plans 'launch' November 15th to some 100 banking institutions. Concept is to educate and inform banking industry officers and employees of latest trends and services.

INMARSAT, maritime mobile service operated by Intelsat, had gross revenues of \$11.6M in last complete fiscal year. However, Intelsat will invest \$150M in next generation Inmarsat birds in spite of low revenues. Intelsat is able to 'fund' ongoing projects which are not profitable by subsidizing 'losers' with revenues from 'winners'.

NATIONAL Technological University, provider of satellite delivered engineering courses to 'industry', will have transponder space on GTE Spacenet-1 (Ku band) to link nearly 20 university engineering facilities to more than 40 corporate downlink sites where students will assemble.

LATEST 'toy' system from Equatorial communications features 4 foot offset-fed ('Kid-like') dish capable of transmitting and receiving data via Equatorial leased transponders on Galaxy 2 and Westar 4 birds. Price for two-way system is around \$6,000 with an estimated 'system operational' cost of around \$100 per month.

AMERICAN Satellite Communications (ASC) first bird launch late in August is 'pre-sold-out'. ASC-1, to be located at 128 West, is scheduled to be primarily data. ASC-1 at 128 will start 'pressures' to reposition all of the C band birds in western end of the belt (see **Coop's Comments**, this issue). ASC-2, now more than 50% 'sold out' in advance, has late 1986 launch.

SKYCHANNEL now broadcasting 13 hours per weekday, Saturdays 16.5 hours. European 'WTBS-look-alike' service pushing 4 million cable homes (although virtually none within UK).

VENEZUELA may get Intelsat 'bargain'; a 77 MHz wide transponder on board Intelsat V bird at 18.5 west (effective 1 November) on 'zone beam'; for unheard-of price of \$1.8M. Reports suggest transponder would be used for telephone company. That is rate some 50-65% below US domestic bird rates recently charged.

NETCOM, videoconferencing firm, and French DGT firm have agreed to work out system to allow programs or videoconferences originating either Europe or USA to be linked between North America and Europe/Africa. Netcom will use transponders on F1R (they own

TRANSPONDER WATCH/ continues on page 50

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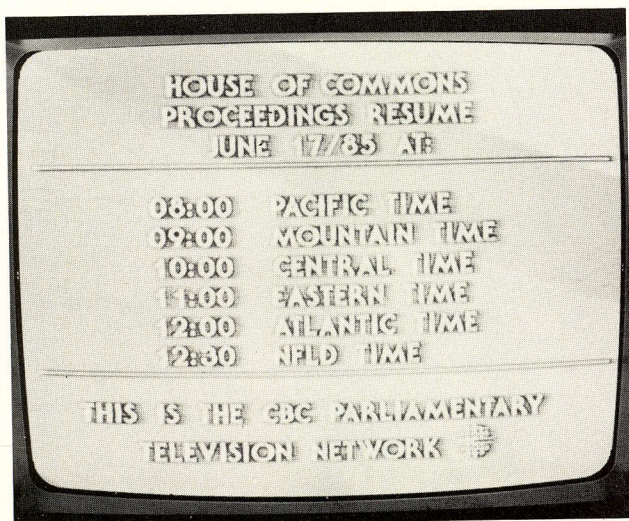
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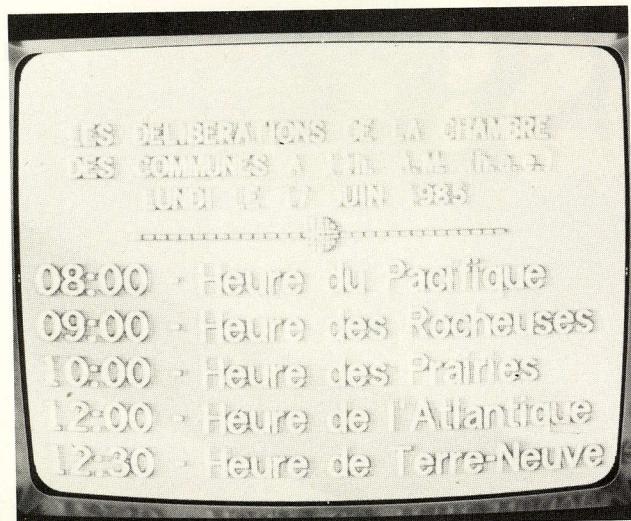
12 and 22) for US end; French will use their Telecom 1 series satellites.

SPACE has taken out two-page advertisement in trade and industrial publications to put services such as CNN, ESPN (and USA) 'on notice' that home TVRO industry will not accept 'unilaterally created' annual fees for non-scrambled services. CNN, ESPN, USA have announced fees of from \$19.95 to \$25 per year. **SPACE** maintains fee-schedule can only be arrived at after negotiation; **services maintain** no negotiation is required and mid-September to early October issues of satellite TV program guides and trade books will carry first formal 'written announcements' from services such as CNN that viewers are, in CNN's (et al) view, supposed to send dollars for viewing. CATA President **Steve Effros**, in view opposing **SPACE** view, claiming that 'marketplace negotiation' can (and does) take place when a service such as CNN announces fees; "If people pay the fee it is OK, but if nobody pays, it is too high and 'marketplace then negotiates' a new, lower rate."

SHINTOM West of America, Japanese owned subsidiary of large auto radio manufacturer, beginning importation of downconverters and receivers to USA for C band reception.

RCA beating corporate drum to promote M/A-Com created Videocipher descrambler system; reason? RCA wants their NTSC system to become standard for direct to home broadcasting, feels S/A and other systems would require replacement of all existing TV receivers, tape decks and most cable TV gear. RCA also planning spring entry into home TVRO field through their RCA service subsidiary.

RADIO SHACK catalog displaying 8.5 foot TVRO dish on front cover is out; system retails for \$1995 and has 80 degree LNB, RS-



looking home receiver with IR, horizon to horizon dish drive but only 8.5 foot antenna initially offered. System is designed for 'user installation' they claim, includes how-to video-tape to guide installation. In spite of product's (shared) front cover spot on fall catalog, TVRO system received less than full page within catalog and product is easily missed by casual catalog page-flipper.

RCA 'under fire' by citizen groups near uplink sites in New Jersey. Local groups claim concentration of satellite uplinks could be blamed for unusually high incidence of birth defects and cancer in region. Two federal agencies are studying charges. Western Union, others also operate uplinks in area.

ARABSAT 1B has been successfully turned over from Comsat General to Arabsat control in Riyadh, Saudi Arabia. Bird completes set of two for Arabsat service.

LATEST Intelsat, V (F11), should be on station at 27.5 west as you read this. Satellite is likely to handle 'spare' functions.

THAILAND government reversed decision, decided **not to purchase** repaired Palapa satellite from insurance-carrier owners. Palapa was retrieved from low earth orbit after failure to complete Clarke Orbit launch and had been refurbished by Hughes after recovery.

FNN to carry Canadian football league games (21 in all) Saturday or Sunday nights 9PM to 12M eastern on TR4, F3R. Championship Grey Cup game will conclude series November 24th.

SBS6 could be modified to provide coverage to Europe on Ku band from 62 west. IBM, new owner of SBS6, is studying possibility after FCC authorized RCA to modify SATCOM 6 for six C band transponder beam into Europe from 67 west.

LOOK for greatly expanded program activity from Wold Communications, on C band birds such as Telestar 301 (TRs 9, 23), and later, RCA Ku birds. Wold has added sufficient programs to raise weekly transmission schedule to more than 100 hours. Programs are largely pre-feeds to individual stations of entertainment slanted series.

NCTA (National Cable Television Association) 'white paper' outlining trade association's plan to become a 'middle man' for scrambled program services for home TVRO users drawing considerable 'fire'. Programmers such as CNN et al feel they have been 'duped' by trade association, do not appreciate the cable operators appointing themselves 'agents' for programming which cable firms neither create nor distribute. Plan, in spite of careful legal posturing, is likely to 'die' because programmers are objecting.

AUSSAT, first Australian Ku band satellite, was to have launched late in August from Shuttle along with ASC-1 and Hughes Leasat 4 (US Navy bird). Attempt to repair earlier Leasat (3) in space also was scheduled.

SHUTTLE launch late in November scheduled to take up Morelos B (second Mexico bird), Aussat 2 (second Australian bird) and RCA's Ku-1, first of the 45 watt per channel, video-dedicated Ku satellites. RCA Ku-1 will be operating from 85 west and when joined by Ku-2 at 81 west, will create first high-video-volume Ku programming capable of being received on small dishes in North America. Ku-2 is scheduled for late December launch.

ARABSAT officials are confusing the satellite insurance carriers, claiming 'total loss' of Arabsat 1. Satellite had minor deployment problems at time of Clarke orbit positioning but nothing to compare to 'total loss' claim which Arabs have filed with London carriers.

SBS-3 (95 west) has 8 video signals on board and until this month that has been only Ku band video reliability available. Look now for GTE Gstar-1 (103 west; find ANIK-D on C band and bump just over 1, east) where Holiday Inns Hi-Net has begun testing half transponder service for Showtime, The Movie Channel, ESPN, Cable News Network and new Hi-Net Satellite Cinema. Transponder assignments unknown but Gstar-1 uses horizontal and vertical interleaved (16 in all). Holiday Inns installing 400, 5 meter, Ku band dishes initially for service. Satellite Cinema will be showing movies 'earlier' than cable programmed movie services.

OLYMPUS, new European cable TV service scheduled to begin operations on Eutelsat-1 October 5th, will routinely program up to 8 separate audio channels each with different language for viewers throughout Europe. Service will program 2PM to near midnight (CET) most days and be commercially supported.

AT&T is apparently getting out of satellite business, as rapidly as possible. D4, in use at 128 west until mid-August (replaced with Telstar 303 at 125 west) will **not** be moved east as replacement for D3 according to AT&T announcement. Future use of D3 and D4 after September 8th in limbo; AT&T says they are cutting back on use of satellites for any telephone traffic except to Caribbean, Hawaii and Alaska.

FINANCIAL news service for Europe, ala FNN in states, planning for operation in 1986. Service, if launched, will be on Eutelsat 3.

FRENCH Telecom 1B bird had failure of high power TWT amplifier tube in July but transponder is apparently back operating normally after unexpected shut-down.

USA TODAY will print in Europe, through satellite connection to Zurich, Switzerland starting in May of 1986.

EUTELSAT-3 scheduled to launch from Ariane vehicle September 11th; Europeans claim the satellite's 12 transponders have been sold out in advance.

MYSTERY in UK over why English are **not subscribing** to the movie channel services Premiere and Mirrorvision. UK leads Europe in VCR use and film rentals, per capita, and early cable firms offering two satellite delivered movie services report exceedingly slow growth or no growth. Mirrorvision channel, which took over from defunct TEN, will add 'Lifestyle' programming in daytime (before movie period starts) to attempt to gain additional subscriber support.

RECENT study performed for NASA suggests 1985 will be crossover year when total number of Ku band transponders (worldwide) exceeds number of C band transponders, in orbit.

FRANCE, not to be beaten by English and Germans, seriously considering 'deregulation' of TVROs. Possible scenario includes annual license fee of \$50 (US).

ICELAND has approved private TVROs plus first cable TV firms. New laws go into effect January 1st.

HOLMES HARDIN, spark plug behind Satellite Broadcasting Corporation plan to scramble 20 or more cable services for marketing to private TVROs, now says his firm would supply 'free' descramblers. Concept hinges on agreement of programmers such as CNN (et al) to allow SBC to market their services. Plan has been germinating for more than 12 months.

EXPORT of TVRO hardware, long held up by Department of Commerce 'red tape' over confusion concerning 'threats to national security', may ease up shortly. New policy, due soon, will free most TVRO system parts from complex export paperwork process.

HBO is blaming Showtime and others for 'foot dragging' on scrambling. Home Box suggests part of reason Showtime may be delaying could be uncertainty of Showtime that M/A-Com Videocipher system will be **only** system in use. Showtime has signed contract with M/A-Com for scrambling system but so far has not released M/A-Com to begin shipment of units.

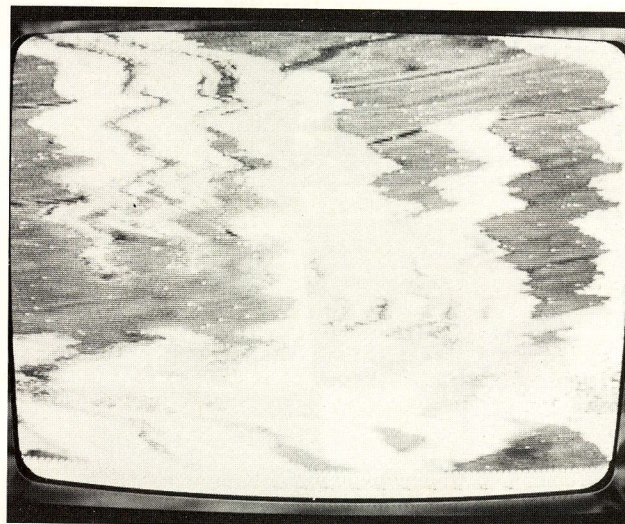
WESTERN UNION losses continuing although firm did reduce amount of loss between 1st and 2nd business quarter of this year. Net loss so far this year around \$25M.

INDESYS is new ABC radio network service transmitted via satellite and then distributed to user premises on unused FM radio station subcarriers. Starting in New York, San Francisco, Los Angeles, Chicago and Dallas October 1, users may transmit 'documents' for between \$.20 and \$.10 per page in as little as one hour's time. System is addressable so only intended recipients will receive transmission. Competition is Zap-Mail, MCI Instant Mail and Easy Link; all of which cost users more money.

INTELSAT video transmission up 38% in most recent reported month; news feeds are heaviest users, result of recent rate reductions by Intelsat for short-subject feeds in off-hour transmission periods.

JAPANESE expect their first two domestic (Ku band) satellites, scheduled for launch late 1987 and early 1988, to have 'profound impact on Japanese life styles'. Cable television systems, until now limited to off-air services, will be major benefactor and Japanese expect 'boom' in cable TV construction, to distribute new programming on ground. Initially, two birds with 32 transponders each will be activated although two additional birds backed by Sony could also be launched at about same time making 128 channels available.

FRENCH TDF-1 (DBS) bird will allow French terrestrial TV system to add two new channels nationwide. Extensive project, valued at



more than \$600M (US), will add additional terrestrial TV transmitters to take feeds from TDF-1. One of two channels will be 'youth oriented', not dissimilar to MTV. TDF-1 has late 1986 scheduled launch date.

TO LIMIT effect of imported TVRO and SMATV equipment in Europe, France and Germany plan to license English (IBA) developed B-MAC system **only to European** hardware manufacturers. Net result is that Japanese firms, unable to get patent license agreement, will find they cannot sell complete receiver systems in Europe because they cannot obtain license to incorporate the patented circuits into hardware. Japanese response is that they will build receivers that are complete 'up to' patented video processing circuits, leave video processing to French and German based firms.

Panasonic has announced C-6000 C and Ku band switchable receiver which has ten button selection of up to ten transponders (pre-set) in either band. Receivers are intended for SMATV, commercial applications where switch-over from C to Ku or vice-versa is part of daily operations exercise.

406 MHz. It is now official. That there will be new search and rescue 'beacon' channel worldwide to send distress signals to polar/low earth orbiting satellites operated by Russia, US and eventually others. Frequency was selected because it is considered 'vacant' worldwide but some remote TV transmission systems use frequencies very close to 406 MHz. **Be warned;** any video transmission **sidebands** that fall into region between 405 and 407 MHz could do harm to international distress system.

GEORGIA satellite TV dealers, through state association, have filed suits in two state courts to stop sale, lease or rental of home TVRO systems by rural electric cooperatives.

COOP/ continued from page 6

scrambling is to ignore it. We have every right to not buy any products from any firm that is in any way supporting the M/A-Com scrambling program. I have never been an 'authorized' Channel Master dealer; I certainly do not intend to become one, now."

Shaun went on to editorialize:

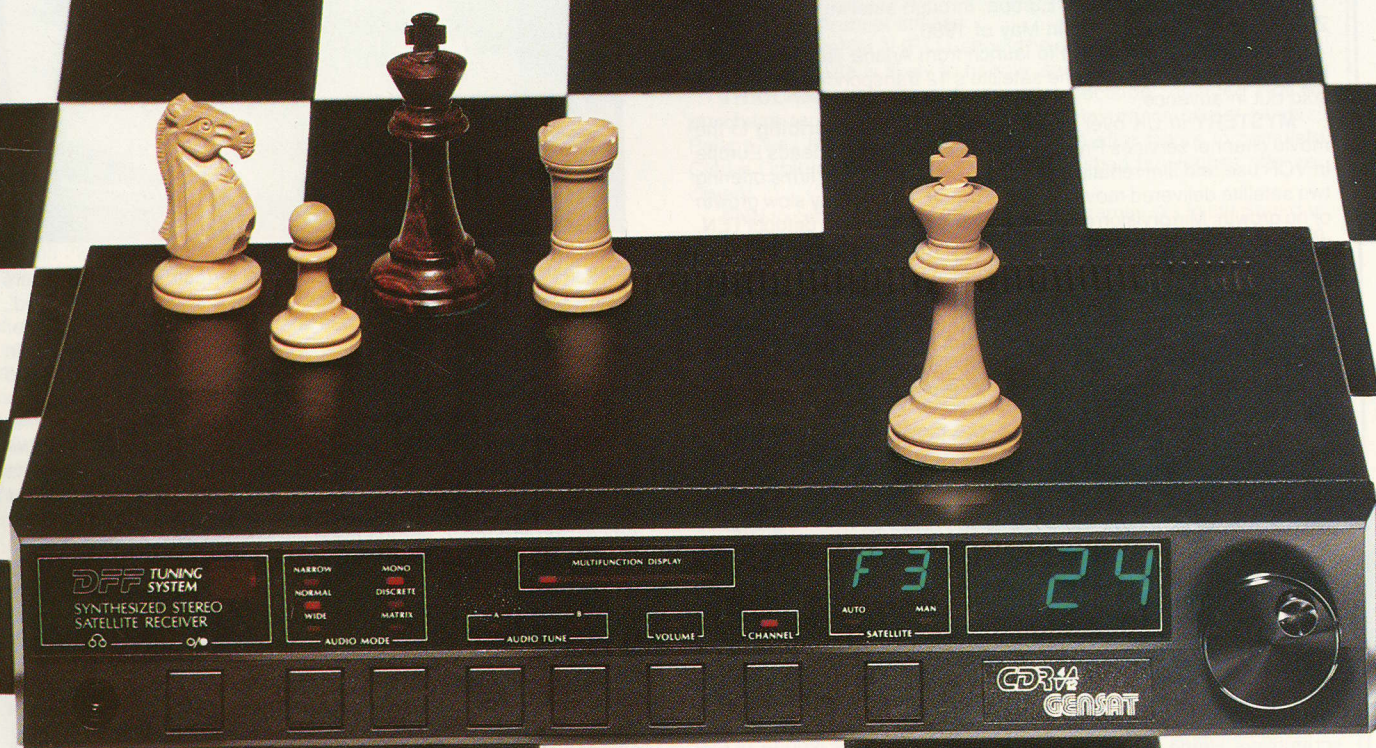
"To (non Channel Master) dealers, my advise is that you stay vigilant, and be alert. If you see any sign that your suppliers are seriously considering buying or handling M/A-Com descrambler equipment, let them know you will do something equally serious; **take your business elsewhere.**"

Shaun went on to explain that if a TVRO dealer allows the present M/A-Com scrambling system to actually become a 'defacto standard', what we are really doing is assisting the cable TV industry to take over the home TVRO industry, **'a home at a time'.**

That's an interesting thought. In **CSD/2** for **July 15th**, we saw how cable's 'master plan' for TVRO includes their capturing nearly 60% of

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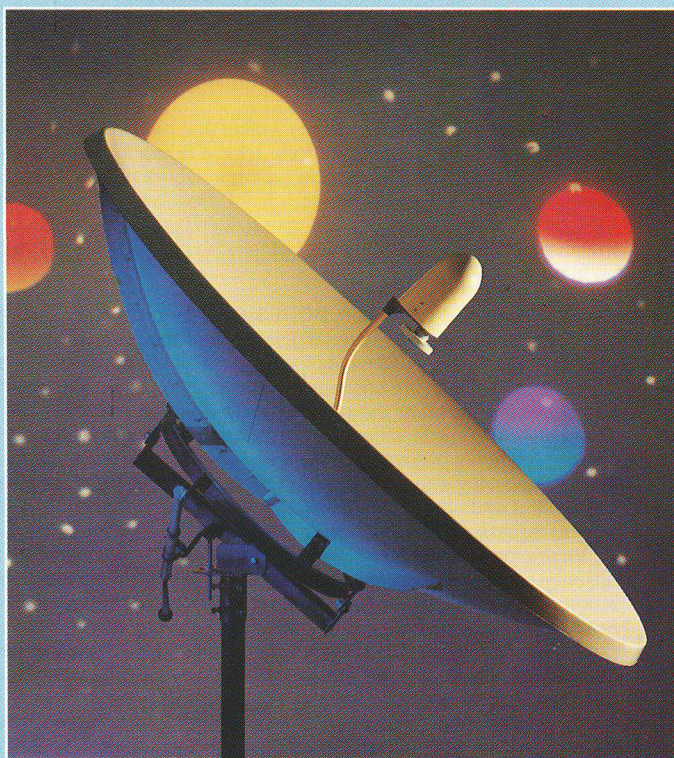
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COOP/ continued from page 51

all TVRO sales of software and perhaps nearly as much of our hardware sales. Even 50.001% is a majority of our business and anything approaching 50% is a serious threat to the independent nature of TVRO. We all recognize that **cable is a monopoly**, that cable franchises are virtual guarantees that the cable firm will never have any competition for its services in a town or city. The entire 'mentality' of cable is to dominate, eliminate competition, and set rates and quality of service which are dictated not by consumer desires but rather by corporate profit structure. In many ways, cable is an unregulated 'public utility' and they get away with things you and I could never get away with because we have competition.

TVRO is the nearest thing to competition cable has ever had; and here they are in a near state of panic about our growth and presence in the marketplace. They recognize that TVRO is inevitable and they want to control and dominate our business so that their cable business can be allowed to operate for another decade or two without 'serious' competition.

Shaun is not the first to suggest that dealers (and distributors) 'ignore' (as in 'not support with orders') those firms that are cooperating with cable's grand plan to dominate and control TVRO. The word 'boycott' is dangerous and I have cautioned Shaun on several occasions about using that word in the same sentence with the name of any firm (such as M/A-Com). But the message can be very plain none the less; for whatever marketing advantage as Channel Master may perceive, by being 'the first' to sign on board with M/A-Com for the VC2000-family descramblers.

In spite of all of this, and the emotion involved, I have to urge that dealers not be quick on the trigger with any supplier in our industry who acts as if they might be thinking about sleeping with M/A-Com. As we point out here, separately, the M/A-Com 'defacto standard' may not be such a shoe-in as the M/A-Com PR steam roller would like you to believe. Our **August 15th CSD** points out some previously unpublished technical problems with the system and perhaps all of this will resolve itself without any firm getting a black name and a 'black hat' because they felt compelled to jump in early. I only hope that Channel Master has a way written into their contract to get out of that contract if the present concerns about Videocipher prove accurate.

*/ **BORESIGHT** is a weekly one-hour TVRO news-magazine seen each Thursday night at 9PM eastern time, Satcom F4, Transponder 20.

BIRTHDAY Greetings

With this issue, there have been 72 issues of **CSD**, on the first of each month, since October 01, 1979. Our October issue will be the start of seven years of 'organized' TVRO activity. With the addition of **CSD/2** back on August 15, 1983, a total of 97 issues have been created and distributed as of September 1st. It is fascinating to me to learn how many people have all 97 issues carefully tucked away.

Six years of my life, devoted to producing CSD and CSD/2, seems like a reasonable chunk of my nominal expected life-period to be doing any single endeavor. When I started CSD in 1979 there was a crying need for information; **'any information.'** Nobody knew how to build feedhorns, for example. Nobody knew how to connect a feedhorn to an LNA and an LNA to a receiver. We were watching a total of 15 cable program services in those days on the original F1 satellite and motor drives did not exist so all of our 'installations' were 'fixed' on a single satellite. Everything, anything, was new and exciting.

As the industry has matured so too has the need for information. Almost nobody today needs to know, or wants to know, how to connect a feedhorn to an LNA; instructions packed with feeds make that abundantly clear. Today we have approximately 30 'publications' in our industry and it pleases me tremendously that after being first, we are not only still here but that in spite of the competition for ad dollars and subscribers, we have been able to continue growing at about the same pace as the industry itself is growing.

But putting together CSD and CSD/2 each month has become an increasingly time consuming task. In the 'old days' I wrote most of

the publication on Provo, sending the typewritten copy 'stateside' in a mail pouch so it would be typeset when I came 'in' a week or ten days later. CSD was printed in Oklahoma in those days so a trip stateside to create it involved a four hour flight to Fort Lauderdale in a two-engine D18 craft, and a connection to a commercial jet going to Oklahoma. When the Oklahoma leg (adding two days to the magazine production time each month) became a hurdle, we moved CSD printing to Florida (early 1982) and I got my two days back again. While in Oklahoma, I stayed over with **Gloria and Rick Schneringer** since they were living in a house they had purchased from me and running STT(I) from that house anyhow. In Florida, I simply checked into a Holiday Inn and turned a room into a paste-up studio for three days or so.

When, after four years of being privately tutored for their schooling in the islands, Kevin and Tasha 'came ashore' in September of 1984, a more permanent headquarters in Florida was established. With 'the kids' in the states 9 months a year, and CSD plus CSD/2 requiring more and more of my time, I found more and more of my own time being centered around the Fort Lauderdale area.

"When do you go to the islands, anymore?" I am frequently asked. My stock answer is that I spend two weeks a month on Provo and two weeks elsewhere; some of that in Florida, some of that in places like Boston or South Dakota or California, working on stories for CSD and BORESIGHT. **The truth is** that in June I spent only three days in Provo and that was with **Doctor Konishi** and his family visting. July was not much better.

My time on Provo used to be my writing and relaxing and project time. When the flights back and forth took 4 hours in slow moving aircraft, I could balance a portable typing machine on my legs and crank out 5 or 6,000 words during a flight. Now, with 80 minute jet rides, by the time I get seated and take a deep breath we are landing on Provo (or Miami). I haven't even bothered to carry a typewriter with me in a year.

When I agreed to support **BORESIGHT** by providing 10 to 15 minutes of programming material last fall, I felt that it would require around 4 working days of time to create the material from start to finish for four shows. Since the concept involves trips to places like **Anderson Scientific** to show viewers our industry in action, part of the 'creating process' is additional time consumed traveling. There are inflexible numbers of days each month and equally inflexible numbers of hours each day. It was becoming increasingly clear that even given 110% effort and careful attention to 'efficiency,' there was a plateau coming for how much 'work' could be done each month.

Producing material for BORESIGHT is a 'gift' of mine; there is no payment to me in any form and I approached the challenge because it fit some concepts I had been carrying about concerning the ultimate need for **'software'** within our industry. From the day I first tuned in a CBC newscast in 1976, or Taylor Howard tuned in a slide that said 'Attention/All Earth Stations' that same year, we as TVRO users have been **consumers of programming**. We have not been contributing to the program creation process. Moreover, the programming we have been consuming has been created by someone else for the use of someone else.

After a year of BORESIGHT I felt we might be smarter concerning the 'programming needs' of not our industry itself, but of the consumers who are buying TVRO. The recently completed TVRO marketing studies (see CSD for May 15 and June 01) told us a great deal about the viewing habits and expectations of consumers.

During the Tulsa STTI/SPACE show in June, I sat down with **Chris Schultheiss** of Triple D; they publish **On-Sat** (a TV guide), **STV** (a newsstand, consumer magazine) and **Satellite Retailer** (a dealer book). Chris and I go back to the first year of TVRO; he, with two other Canadians, had designed a very sophisticated TVRO receiver (from Comm-Plus) which was first displayed at an industry trade show in San Jose (Ca.) in July of 1980. Chris shares the same deep seated interest as I in consumer viewing habits and trends, and he has been involved with **John Kaul** (Kaul-Tronics) in creating a one-hour-per-week TV program (**Satellite Showtime**, F4, TR5, 10 PM Tuesdays). We talked about the possibility of reducing the competitive friction between 'Showtime' and 'Boresight' and presenting a more 'unified' image to the viewers. And we worked out a loose plan to present to John Kaul and **Shaun Kenny**, the producers of the two programs.

Then during July we had a two-day meeting in North Carolina to

discuss it all; Chris and I, Shaun and John, and **Doug Brown** who is a co-owner with Chris in Triple D. At that meeting, a more elaborate concept was discussed; a concept for a more intensive 'program service' for TVRO viewers. Note the word '**viewers**'; not TVRO dealers nor TVRO distributors nor TVRO original equipment manufacturers.

The more we discussed and fine-tuned the concept, making it better each hour, the more excited we all became. Excitement of course breeds foolishness and emotion and when you find five grown men excited about the same subject at the same place, and at the same time, you probably run the risk of losing sight of some basic business fundamentals. So we 'slept on it' for a period of time.

A television 'programming service' directed specifically at TVRO consumers is planned. It is an ambitious project requiring mechanical things like uplinks, studios, transportable uplinks and more studios. But far more important than the mechanical gadgets required will be the programming itself. And the way that programming is 'sold'; that is, supported or funded. Anyone with money to waste could go up on satellite by buying the mechanical gadgets required and the transponder time. None of us have money to waste and the programming must click from the minute this new service debuts. Clearly, putting the programming together would be a crucial element in creating a new programming service for TVRO viewers. And making that programming 'pay' would be a heck of a challenge.

So who, in our group, had some background in that area? More important, since skills can be learned, who had the time to devote to overseeing the program development? The meeting room fell silent.

"If I can get out of the day-to-day grind of creating CSD" a small voice inside of me was saying **"I would like to try it, first."** Nobody disagreed but getting out of creating CSD each month seemed like a pretty formidable hurdle. We slept on it.

CSD In October

As we start our 7th year of CSD, there will be a few small changes in the way this publication is put together. Effective with the October issue:

- A) CSD will be issued like CSD/2 on the **15th** of each month. That means **your next issue of CSD will be October 15th**. After September 15th, CSD/2 will no longer be issued. Subscriptions will be adjusted automatically to reflect this change and renewals will adjust accordingly.
- B) **CSD/2** has been the only industry trade publication **not issued** on the first of each month. We felt there was a 'reading hole' in the middle of the month and slotted CSD/2 accordingly. **By moving CSD to the 15th of the month**, we will continue to fill that 'hole' but with a CSD sized publication rather than a CSD/2 sized publication.
- C) The October 15th issue will be dated October (15th) and there will be no missing months in the seven year sequence.

And now the key part.

- D) Publication of CSD will move to the offices of Triple D in Shelby, North Carolina (see masthead change on page 1, here). I have worked out a (private) business arrangement with Chris and Doug which accomplishes the following:

- 1) CSD will remain CSD but with a production change as previously noted;
- 2) **I will continue to write** significant parts of CSD but will no longer be encumbered by the layout and paste-up, printing and distribution chores.

I figure that with these **mechanical** changes, I'll get back nearly two weeks each month; two weeks working time which will be devoted to the new TVRO programming service effort.

The changes in CSD will be as 'minor' as we can manage; naturally with a new typesetting arrangement and someone other than I doing the actual paste-up and layouts, there will be some visual-change apparent. The content, however, the editorial 'direction' and the 'flow of material' will change as lightly as practical.

The **'1986 TVRO Handbook'** remains my responsibility. The 544-page publication will be released in November rather than September and **that decision** was reached **prior to** the current change scenario primarily to accommodate some of the editors who are supplying material for 'The Handbook.'

AHEAD

Other than this 'by-way-of' announcement, I anticipate no formal announcements nor details for the new TVRO programming service for a month or so. I won't even give it a name here and any you hear through the rumor-mill will probably be incorrect.

I will 'tease you' with this conceptual information:

- A) The audience for this new service will be home TVRO consumers. The service **will not be scrambled**; ever.
- B) Programming will be designed to inform, excite (although not-to-riot!), and, entertain **owners of TVROs**.
- C) **TVRO dealers** will have a very unusual business opportunity to participate in the service; to make money as it were and to enhance their own businesses at the local/retail level with the channel.

That's it. Anything else you hear or read is conjecture or foolishness. We are pledged not to release any hard information until all of the contracts are signed, and the facility is falling in place. And that's good; the ten year history of programming services for satellite is filled with glaring examples of services promised that never made it, or programming that turned out to be different than anticipated. This will be the first (and therefore, at inauguration, **only**) satellite television programming channel **created exclusively for the home TVRO viewer**. We will be the first that is not a cable programmer being shared with TVRO and as a TVRO dealer or distributor, having **'your own programming channel'** to serve our own customers will be a very important step for our industry.

TWO DEGREES Final

The long anticipated FCC decision regarding 'uniform spacing of C band satellites' has come down; with three minor exceptions there will be a C band satellite **every 2 degrees** from 146 west back around to 62 west when the orbit belt is finally filled up. Most people were hoping it would not turn out that way.

Here's the problem.

When you have satellites spaced every two degrees, through the **Clarke Orbit Belt**, there is a great potential for interference. All dishes have something called 'beamwidth' and when the beamwidth becomes too large, your satellite antenna may intercept signals from two or three different satellites at the same time. You make smaller or tighter beamwidths by building larger (diameter) antennas since the larger the antenna, the narrower the beamwidth. This says that as you make antennas smaller and smaller, you will reach a point where even though the pictures are strong enough, the same pictures received when there are other satellites only two degrees away will have interference in the back (or fore) ground.

Depending upon which study you believe, at someplace between 12 foot antenna diameter and six foot antenna diameter, antennas will no longer perform properly when satellites are spaced at 2 degree intervals in the belt.

The question here is not which antenna performs, and does not perform, but rather what is the real impact of the FCC's final decision in this matter. First, **see table one** (page 60).

What this table tells us is that the FCC seems to have made an effort to stack adjacent satellites so that **the bird's polarization sense** will provide **additional protection** for small terminals. That is, notice that from F1R at 138 through Aurora 2 at 146, we have alternating Galaxy and RCA formats. That is just like you now have between F3R and Galaxy 1; the same channel numbers are polarized in **opposite** directions, so the 'isolation' of being cross-polarized adds to the isolation of the bird to bird spacing. **The net result is no interference.**

What the Commission has tried to avoid is placing two Galaxy format (or two RCA, etc.) in **adjacent** orbital slots. They have also tried to avoid stacking a Westar format (which is 12 transponders, all horizontal) adjacent to a Galaxy format bird since the same polarization shares the same frequency for these 12 channel (horizontal only) birds. And, the belt shows a pair of the older 12 channel Westar birds still with assigned places; Westar 2 at 79 west and Westar 3 at 91 west. Western Union, in replacing these 12 channel birds with 24 channel birds will have to adopt the 'Galaxy' format for both of these locations (ie. just like Westar 4 and 5).

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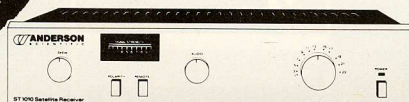


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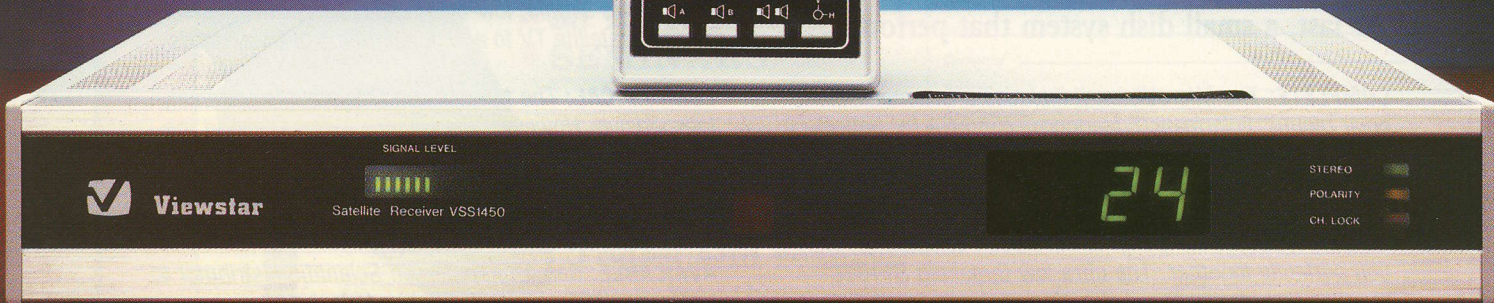
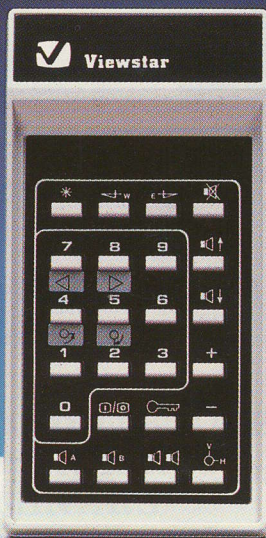
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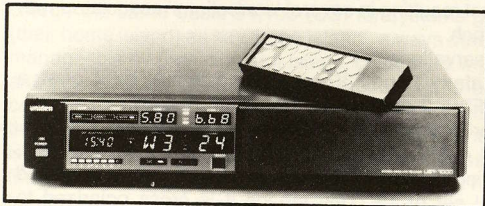
UST 730 Antenna Positioner features built-in programmable antenna control and Opto-Interrupt circuitry.



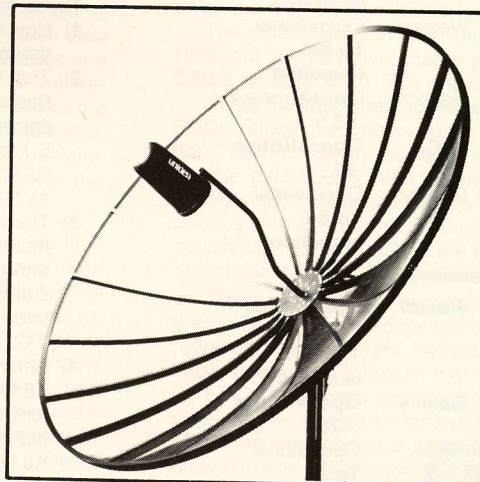
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FCC MANDATED C Band Orbit Belt

Degrees West	Satellite Designation	Polarization Format	Bird Status
62	SATCOM 7	RCA	To be launched
64	ASC 3 (4) (Ku Also)	?	To be launched
67 (1)	SATCOM 6 (2)	RCA	To be launched
69	SPACEnet 2 (Ku also)	Westar	Operational
72 (1)	SATCOM 2R	RCA	Operational
74	Galaxy 2	Galaxy	Operational
76	COMSTAR (D4)	RCA	Was At 128
79 (1)	Westar 2	Westar	Operational
81	SATCOM 4	RCA	Operational at 83
83	ASC 2 (Ku Also)	?	To be launched
85	Telstar 302	RCA	Operational at 86
87	SPACEnet 3 (Ku also)	Westar	To be launched
89	No bird assigned	?	To be launched
91	Westar 3	Westar	Operational
93	Ford 2 (Ku also)	?	To be launched
95	Galaxy 3	Galaxy	Operational 93.5
97	Teistar 301	RCA	Operational 96
99	Westar 4	Galaxy	Operational
101	Ford 1 (Ku also)	?	To be launched
(Window for Canada, Mexico satellites)			
120	SPACEnet 1 (Ku also)	Westar	Operational
122	No bird assigned	?	To be launched
124	Westar 5	Galaxy	Operational 123
126	Telstar 303	RCA	Operational
128	ASC 1 (Ku also)	?	To be launched
130	SATCOM 3R	RCA	Operational at 131
132	Galaxy 1	Galaxy	Operational at 134
134	No bird assigned	?	To be launched
136	SPACEnet 4	Westar	To be launched
138	SATCOM 1R	RCA	Operational at 139
140	Galaxy 4	Galaxy	To be launched
142	AURORA (SATCOM F5)	RCA	Operational at 143
144	Westar 7	Galaxy	To be launched
146	AURORA 2	RCA	To be launched

1/ Indicates birds are spaced **3 degrees** from nearest birds to east, but **2 degrees** from nearest birds to west.

2/ Indicates tentative FCC approval to allow 6 of 24 transponders to be boresighted on Europe with predicted EIRP of +38 dBw.

Polarization formats include **RCA** (i.e. Satcom 1R, 2R, 3R, 4, Aurora, Telstar and Comstar families), **Galaxy** (i.e. Galaxy 1, 2, 3, Anik-D and Westar 4 and 5), and **Westar** (i.e. Westar 2, 3, Anik B, and Spacenet).

COOP/ continued from page 55

Also ahead, the Commission is also insisting that the ACS birds at 64, 83, and 128 also adopt the Westar format to avoid interference. The Ford birds at 93 and 101 will have to follow the RCA format to fit in without interference. The unassigned slots, 89, 122 and 134 will apparently also follow the RCA format.

If all of this happens, the small dish world can now build on a relatively secure future; **dish beamwidths should not be a problem** for any sizes which are designed to function with **4 degree** spacing (since in the real world, the birds will be spaced at 4 degrees with common polarization schemes). What will be **critical** is precision control over polarization rotation systems since highly undesirable cross-polarized 'energy' will be present 2 degrees off of boresight in both directions from most birds.

When will all of this happen? Slowly, over time. From this point forward, new satellites will locate to the new assignments (see table here). For example, the GTE Spacenet bird, to launch September 11th or so, will immediately head for 87 west. Now the plot thickens: Telstar 302 is located at 86 west and it will be required to 'move over' to 85 west (new assignment, from table) prior to Spacenet (3) turning on. Thus as new satellites are launched, causing conflicts with present positions, older satellites will have to move. In some cases this will start a domino effect resulting in several 'corrections' associated with a single (new) launch.

These final observations:

- 1) Note that **Galaxy 1** and **F3R** will both be coming **back east**; a degree for F3R, 2 degrees for G1. **That's good news.**
- 2) The 'Westar' polarization format may be confusing to some. Basically, it is for a horizontal-only bird, using 12 channels, corresponding for those 12 transponders with the Westar 4 and 5 horizontal set of 12. This means it is cross polarized to SATCOM birds on those 12 channels, but same-polarization as Galaxy for those 12 channels.
- 3) There are **33** 'C band' orbital positions in the final form, plus those slots activated between 101 and 120 by Canada and Mexico. Neither Canada nor Mexico has accepted 2 degree spacing (yet) so while their 'slots' could accommodate another 8 birds (at 2 degree spacing), it is unlikely we will have more than 4 C band birds here for the foreseeable future.
- 4) Antenna positioners planning for the long term future will need **no fewer than 41** memory locations for the C band slots **alone**, for North America. Ku band allocations would, **in theory**, double that requirement although the FCC is co-assigning C and Ku birds to the same locations (either two separate birds, or, a dual-band bird) so ultimately the **real number** of memory slots will be far closer to 41 than 82. If a positioner will also be used with a horizon to horizon drive capable of looking **outside** of the North American portion of the belt, the number of required memory slots becomes a function of the visible arc from any given location. In the best locations (close to the equator) the maximum number of 2 degree spaced slots visible is on the order of 75. But, it is highly unlikely we will ever see spacing closer than 3 degrees for the Intelsat family of birds at C band.

A 'safe' capacity for antenna positioners? **Anything over 75** would seem to be a wise decision at this point in time.

TVRO/Bahamian Style

Some of the first home TVRO systems went into the **Bahamas**; that island nation that lies as close as 60 miles to the Florida coast, roughly parallel to the South Florida coastline between West Palm Beach and the Keys. There was good reason. Early attempts to provide cable service to the two primary population centers (Nassau, Freeport) were disasters for American investors. Distance (125 miles plus) to American transmitters, often unsettled weather along the transmission path (causing severe signal fades and signal outages), and most of all, local weather in the Bahamas (hurricane force winds) knocked down reception and systems at every turn. \$1,000 and up home-style TV antennas number in the thousands; both for Bahamian natives and foreign 'ex-pats' who live here full time or during the winter.

SMATV started here also; for the same reason. Americans piling

off of Eastern and Bahamas Airline jets wanted sun, sand, shopping and . . . American TV. Local television, a single government operated channel, is not very exciting. An early 'copyright violation case' started here; an American corporation owned a hotel on the beach and it installed satellite antennas to pull in American programs. The programs were piped into guest rooms; no extra charge. The MPAA, HBO and others objected and brought suit. Had the hotel been Bahamian owned or French owned (etc) the case would have soured; but because it was American owned, and the suit could be filed in US courts, it ran the course.

The Bahamas recently became the 110th member nation of Intelsat. That means they had no stake, claim, nor interest in international satellite tele-communications previously. Locals who are in the TVRO business wonder what the nation's new involvement in 'Intelsat' will really mean to them.

Harry Wong is one of five brothers who operate 'Island TV'. This firm is probably the largest selling TVROs in the Bahamas. Right now they prefer Raydx 10.5 foot and Paracclipse 12 foot antennas, DX and Drake receivers. A typical system sells for \$4,100 (US) but as Harry is quick to point out, the cost of goods imported is increased by an **80% duty** charge. That makes everything, when landed, about twice as expensive as in Fort Lauderdale; barely 100 miles away.

Island TV has been averaging five complete systems sold and installed, **per day**, six days per week, for quite some time now. They charge the same basic \$4,100 (US) for systems going into Nassau (their home island) as say 'Long Island', a ways down the chain. They manage this by providing 'out island' customers with the pole, plans, and jigs to install their own base support pipes and run their own cabling underground. **The customer** does all of this in **advance** and then Island TV ships virtually totally assembled antennas to the out-island location by boat. When the antenna and base are ready for the final 'hoist' to the pole, a technician from Island TV hops on a commuter airline plane and spends a couple of hours completing the installation and system tweak. There is a slight surcharge to cover the airplane fare of the technician.

Harry Wong and his four brothers would be in the big-time TVRO business if they were in the states; any firm moving upwards of 100 retail systems per month would have every TVRO distributor and direct-selling OEM knocking on their door weekly to sell them product. Harry is in charge of decisions for equipment; he attends TVRO trade shows (he has from the earliest shows), quietly looks at equipment, and with the eye of a professional decides how long the equipment will take to install, how it will work with the weaker foot-prints in the Bahamas, and most important, how long it will last in the heavily salt-laden atmosphere. 'The Wong Brothers' are, in a sense, 'The TV Guys' for most of the Bahamas.

Competition? They have some; Harry believes that perhaps 50 terminals per month are sold by others, total. No single firm does more than 30% of those and many come in 'direct' to the users who buy from US magazine advertisements.

Intelsat? Harry is concerned, but not worried. **'Over the years, many of the larger hotels have become Bahamian in ownership;** in fact the government itself owns or controls many of the larger hotels. How can they 'allow' some outside group, such as Intelsat, to tell them that they must prosecute for SMATV operation? **Is the government going to become a party to suing itself?** I doubt it! And if they won't allow themselves to be sued, how can they allow a non-Bahamian-government owned hotel to be sued or prosecuted for SMATV signal use?"

Scrambling? Harry again. **"It takes us 30 minutes to fly to Florida.** When home descramblers become available, I know what will happen; somebody in Florida will establish some sort of 'agency'; they will sign up for descramblers, on account, for Bahamians with private TVROs. The descramblers will be delivered in Florida but brought to the Bahamas. People will pay, like people in the US will pay, but the descramblers will be in places like Eleuthera or Long Island, not Fort Myers or West Palm Beach. **We are not concerned;** we'll make more money with this process because there will be fees attached to arranging for the descramblers. I am not worried, but like any TVRO dealer, I would like to see it settled so we can put this part of our history behind us."

Harry Wong has been around TVRO since there has been

TVRO. He and his brothers operate a well respected and important 'communications link' to the 'outside world' for the residents and citizens of the Bahamas. His firm is one of the few, inside or outside of the United States, which major distributors such as Echosphere extend 30 day credit terms to. You hear much about 'the danger' of dealing with 'offshore installers' of TVRO; that they are untrustworthy, unreliable, and anxious to take advantage of the poor American supplier. It's good to recognize that even if there are some shady off-shore characters dealing on the fringes of TVRO, there are many 'Island TVs' and not a few Wong Brothers out there who command the respect, admiration and trust of American suppliers.

CO-OP Not 'Coop' Approved

The National Rural Electric Cooperative Association, and the National Rural Utilities Finance Cooperative conducted four fast-paced meetings for operational personnel at the rural electric Co-Ops recently. They hit Atlanta, Dallas, Denver and Minneapolis with a slick, well-greased presentation which reminded me of the early days of TVRO.

The theme of their 'seminar sessions' was simply that electric cooperatives **must** get into the TVRO system business (selling, renting or leasing systems). They have done some extensive feasibility studies on how rural electric customers, largely served by these cooperatives, need better quality television. They feel there are at least 1M US homes with no television reception and another 40M which are ultimate candidates for TVRO. Those are good numbers.

The groups feel that other predictions, for 10M home TVROs by 1990, are 'conservative' (**cable people** forecast 8.4M by 1990; see **CSD/2 for July 15th**). The reason they feel 10M is conservative?

"That number does not take into account the participation of EMCs (electric member-owned cooperatives) **in TVRO distribution."** Naturally the thrust of their new 'sell TVRO' effort is to get EMCs into the TVRO distribution business.

My instant reaction, to EMCs selling TVRO, was 'so who cares?', about a year ago. As the EMC plans have matured, **now I care.** And you should too if you still have a vision of TVRO being largely sold by independent TVRO dealers.

There are significant resources in an EMC; and when you 'bundle' the EMCs together in some sort of cooperative effort, as a group they represent **more dollars** invested and **more dollars** flowing **than cable television.** I thought that might get your attention.

EMCs in Georgia and South Carolina have been testing TVRO sales, rentals and leases for a year now. They have a significant body of information collected and that information forms their 'game plan' to draw perhaps 150 other EMCs into selling TVRO shortly. Ultimately, the number will be several times as large.

EMCs in Georgia tried to get into television once before; they wanted to apply their ultra-low-interest, 30 year loan dollars to the creation of rural cable television systems. Their plan was moving ahead until Georgia's cable operators got upset and obtained a state law which prevented EMCs from continuing in the cable business. The battle here is over dollars.

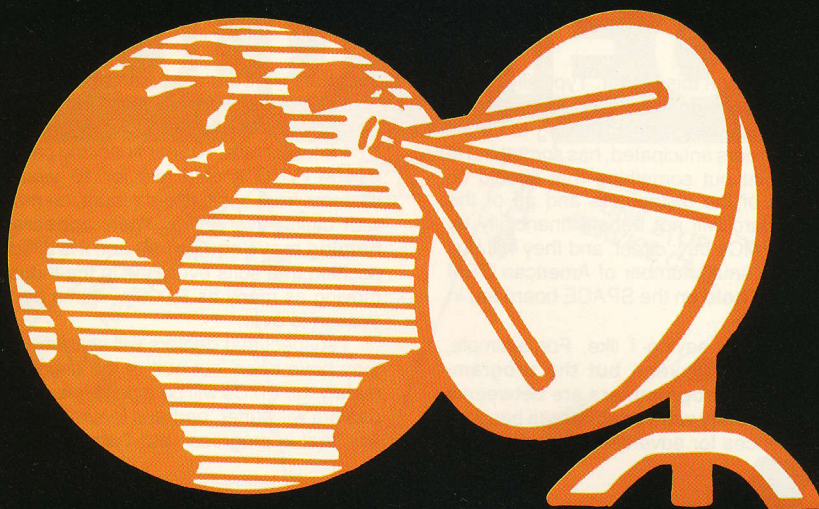
An EMC has state and federal government subsidies and protection'. They qualify for loan terms (long length/low interest) which no other entity in America qualifies for. That's how EMCs were set up in the 30s as a tool to make electricity available in rural areas. The farmers needed and wanted electricity to modernize and the US Congress created a framework to allow this to happen. As the electric plant 30 year loans were paid off, and the EMCs rebuilt with new plants and new loans, eventually they ran out of things to do with their low interest rate money. Television seemed like a good choice since rural television reception has seldom been good. **Cable was dead before** the Georgia State Legislature passed a law pre-empting their participation, simply because even a 30 year, low interest loan will not make cable viable when you only reach one home every couple of cable-miles.

Satellite TV, cable without 'the cable', fit EMC plans perfectly.

Some TVRO dealers are distressed about EMCs getting into the TVRO business. Georgia TVRO dealers, through their state association, have filed against the plan in their state; they hope to stop EMCs from moving ahead with TVRO there, either with a court decision or new legislation.



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SPACE has been unusually silent on this matter. Typically, when something comes along that threatens dealers, SPACE responds. Not this time. **Perhaps** the big equipment orders, flowing to OEMs from EMCs, or the big equipment orders anticipated, has something to do with this reluctance. I will point out something that should be obvious; **most** of the OEMs, **all** of the distributors and **all** of the dealers sitting on the SPACE board will not benefit financially by EMCs getting into our business. EMCs buy 'direct' and they will buy 'American' where possible. A very small number of American OEM firms will benefit and the seats **they hold** on the SPACE board are in the minority.

Some of what the EMC group is saying I like. For example, **"Scrambling is not going to affect anyone but the programmers"**. I like that attitude. Or, **"Basic programmers are between a rock and a hard place; they don't really want to scramble** because they want to increase their audiences for advertisers. But the cable

operators want them to scramble." That seems straight forward to me.

The EMCs now have an 11 week 'rush program' underway to get as many EMCs into TVRO selling **this fall** as possible. They have an 11% interest rate, 10 year financing package worked out on the theory that a TVRO should last for 10 years. And they have packaged systems from basic (fixed mount, no motor drive) clear to the top end with digital everything. **Their appearance in the marketplace is helping move equipment** and it is difficult to fine tune an adversarial position that suits everyone in the industry when EMCs may end up moving as many as 5,000 systems per month before the fall selling season is over.

I suspect that dealers will scream, and distributors who figure out they have been 'cut out' of the distribution will scream but that ultimately the EMCs will be a permanent part of our business. And many dealers will suffer, perhaps leave the business, as a result. Some will say 'that is progress'; **but I am not so sure.**

BALL In M/A-Com's Court

I was probably not a very popular fellow in Burlington, Massachusetts around August 16th; that would have been the day when some Fed-X copies of **CSD/2** for **August 15th** arrived. If you missed that issue of CSD/2, it contained a detailed analysis of some testing conducted by **United Video** (they uplink WGN on TR3, Galaxy 1). The testing was created to determine several things:

- 1) Whether the 'bit error rate' (that magic M/A-Com technique to determine the descrambling ability) of a particular terminal or receiver will allow perfect descrambling.

A dozen consumer level receivers, rounded up for the tests, were put on line and bit error rates measured. In the CSD tests **last March**, we didn't have M/A-Com cooperation so we could not measure bit error rates. M/A-Com later claimed our tests were 'flawed' because we could not or did not measure 'BERS'.

- 2) Whether the unusually high number of data, text and audio subcarriers on the WGN transponder would in any way cause problems with the Videocipher system. As we noted on August 15th, there are now 25 subcarriers slotted on TR3 and that's a bunch of potential difficulty for Videocipher.

For M/A-Com, the tests came out badly. Worse than badly. I cannot imagine that they did these tests without sending their brightest, most high-power engineers to United's near-Chicago uplink site. If I had been in charge, the sampled uplink scrambler and downlink descramblers would have arrived in the fabled private M/A-Com jet with a team of engineers, each with a tweeking tool super-glued to his thumb. Alas, a fellow named **Randy Pike** went along with the hardware and in reading through the United engineering report of the tests, I had to feel sorry for Randy. He was in trouble before he unpacked his boxes.

I won't repeat the various conclusions of the United tests here; you'll have to scout up your own copy of CSD/2 for August 15th. Here is a **sample** of some of the 'summary discussion' appearing in that report however:

"The digital channels 'died' in the presence of the subcarriers (1 x 10⁻²). Both the digital data and audio channels were unuseable."

And,

"The bit error rate was never better than 1 x 10⁻⁵ under any conditions (and while) this may be suitable for digital audio, it would have to improve by an order of magnitude to be useful for 'real' data transmission . . ."

United invited me to witness these tests. I'm not sure that M/A-Com knew I was invited because I had a schedule conflict and could not make it. I asked **Doug Dehnert** of USS/Maspro to attend in my place and he brought along a bunch of receivers for testing, at United's request. We published bit error rates for 12 consumer receivers on August 15th; a M/A-Com consumer unit tested did not do well.

Here's where I believe the scrambling thing is now.

After these tests, I am more convinced than ever that M/A-Com has **significant technical problems** in addition to significant political and perhaps legal problems. They claim they have \$40M invested in the scrambling development to date. I'd give them no more than a 30% chance of getting that investment back, today; and the percentage is dropping weekly.

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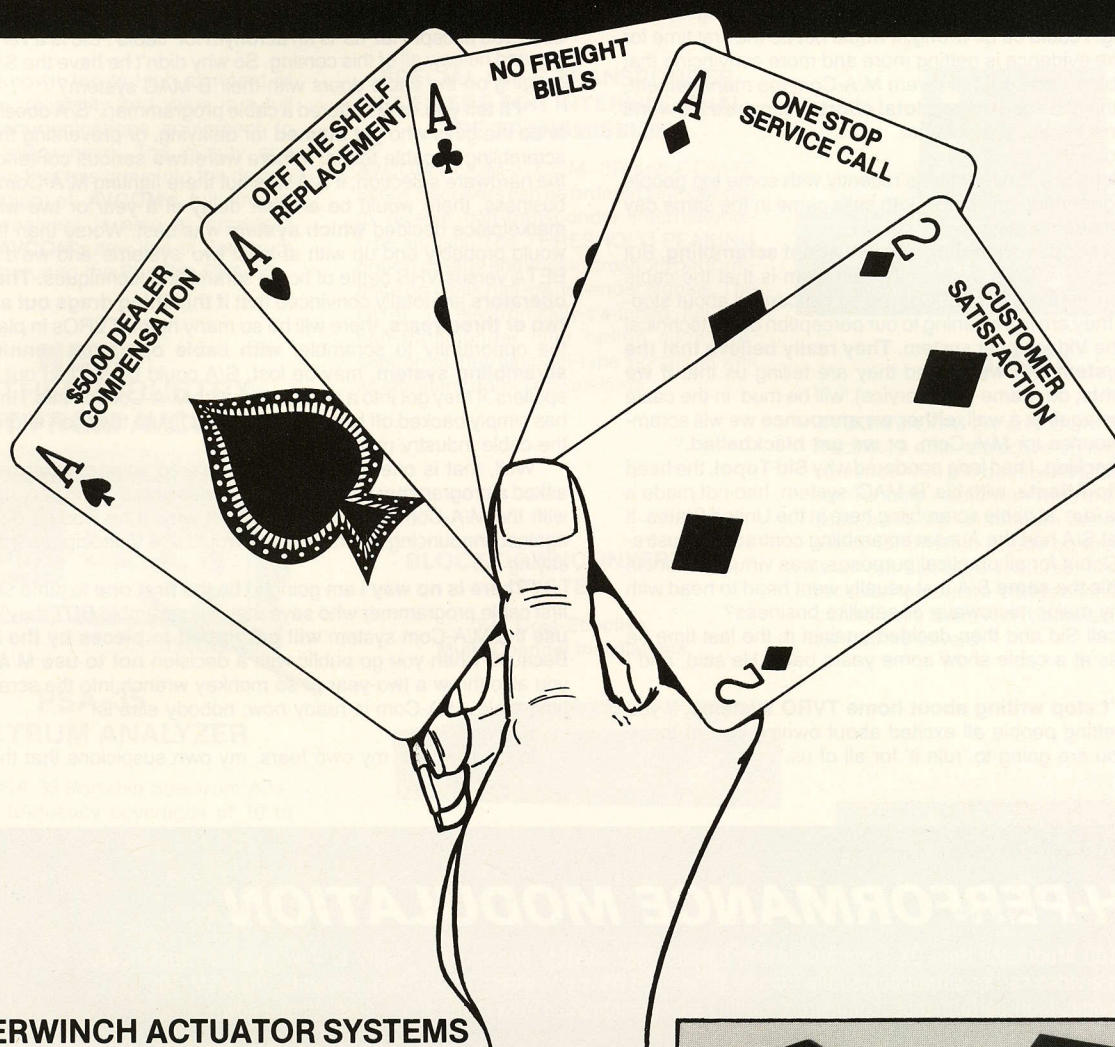
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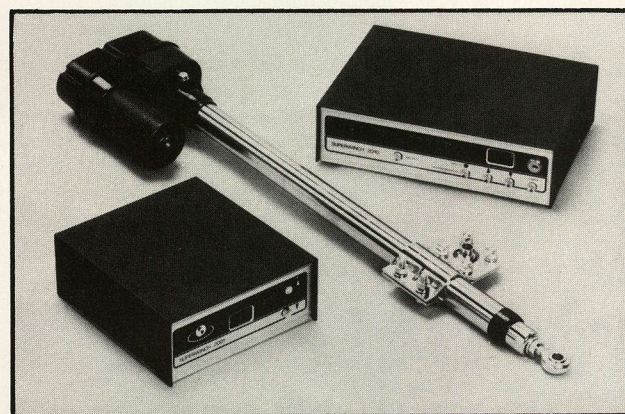
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The United tests could all be wrong. The guy inside of HBO who is sending me piles and reams of cable system 'trouble shooting reports' may be all wrong. I could be all wrong; it would not be the first time for any of us. But the evidence is getting more and more convincing that M/A-Com may blow that \$40M. If I were M/A-Com top management, I'd cut out all of the hype and make a **total effort** to convince the world that they have no technical problems.

And if they don't?

I had two telephone conversations recently with some top people in the cable programming universe. Both calls came in the same day and both said the same thing.

"We want to adopt scrambling, we will adopt scrambling. But we don't want the M/A-Com system. The problem is that the cable industry, in particular the cable MSOs, are so concerned about stopping TVRO that they are not listening to our perception of the technical problems with the Videocipher system. **They really believe that the Videocipher system will work.** And they are telling us that **if we don't support this**, our name (and service) 'will be mud' in the cable camp. We are up against a wall; **either we announce we will scramble, and we announce for M/A-Com, or we get blackballed.**"

I did some checking. I had long pondered why **Sid Topol**, the head man at **Scientific-Atlanta**, with his 'B-MAC' system, had not made a more aggressive 'run' at cable scrambling here in the United States. It bothered me that S/A had the Aussat scrambling contract for Australia, using B-MAC, but for all practical purposes, was virtually silent in the USA. Was this the **same S/A** that usually went head to head with M/A-Com on any major microwave or satellite business?

I started to call Sid and then decided against it; the last time he talked to me was at a cable show some years back. He said, and I quote:

"If you don't stop writing about home TVRO systems, if you don't stop getting people all excited about owning one of these terminals, you are going to 'ruin it' for all of us."

Well, he was right as he often is and I didn't stop writing articles for **TV Guide** or other magazines and sure enough, I did 'ruin it' for 'all of us'; if you accept that 'us' is an acronym for 'cable'. Sid is a very bright guy and he saw all of this coming. So why didn't he have the S/A guys banging on the cable doors with their B-MAC system?

"I'll tell you why" offered a cable programmer. "S/A doesn't want to be the guys who get **blamed** for delaying, or preventing the rapid scrambling of cable feeds. If there were **two** serious contenders for the hardware selection; if S/A was out there fighting M/A-Com for the business, there would be another delay of a year or two while the marketplace decided **which system** was best. Worse than that, we would probably end up with at least two 'systems' and we'd have a BETA versus VHS battle of home scrambling techniques. **The cable operators** are totally convinced that **if this thing drags out another two or three years**, there will be so many home TVROs in place that the opportunity to scramble, **with cable operators running the scrambling system**, may be lost. S/A could be singled out as 'the spoilers' if they got into a product war with M/A-Com on this. I think S/A has simply backed off because they don't figure they can afford to get the cable industry mad at them . . ."

Well, that is one man's opinion. I asked several other people. I asked a programmer who makes no bones about being very unhappy with the M/A-Com system (not United) why, if he was so dead-set against announcing that his service would use Videocipher, he wasn't saying so.

"There is no way I am going to be the **first one** to jump ship; the first cable programmer who says they will scramble **BUT** they will **not use** the M/A-Com system **will get ripped to pieces by the MSOs.** Because when you go public with a decision **not to use M/A-Com**, you also throw a two-year or so monkey wrench into the scrambling time table. M/A-Com is ready now; nobody else is!"

Humm.

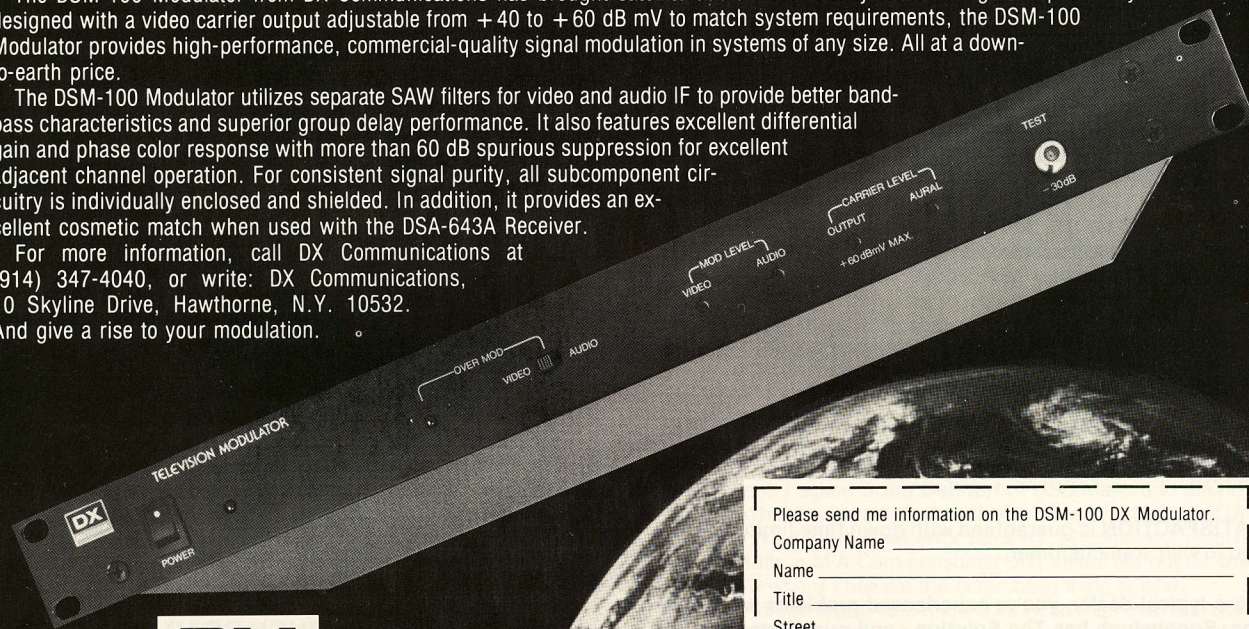
In other words, my own fears, my own suspicions that the M/A-

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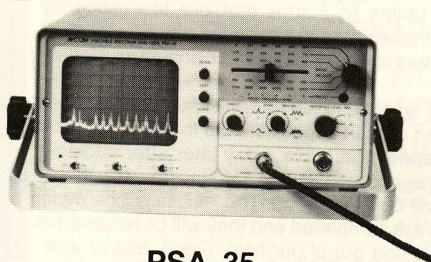
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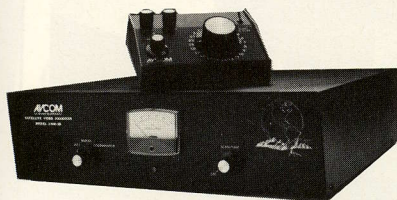
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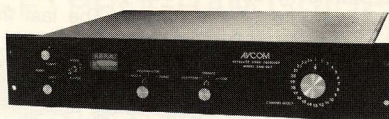
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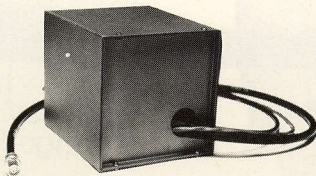
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Com system may have technical glitches **are shared** by others. But nobody who has this fear or technical proof is willing to 'speak up' for fear that they will be ostracized by the cable MSOs.

What about B-MAC? I dug out my multiple-hundred-page book published in Australia detailing the B-MAC system and started reading. Then I made some calls around. I learned that several cable programmers wanted to have the B-MAC system demonstrated to them; United, for example, had made **a formal request to S/A** to have an S/A B-MAC system brought to Illinois at about the same time that M/A-Com brought in their Videocipher encryption system. S/A said they were 'so busy getting the pieces together to meet their Australian deadlines that they had no equipment and no personnel to put on that test'. If I was scared that somebody **might buy my system** because it worked better than a competitor's, I guess one way to prevent that from happening would be to somehow not have the time to demonstrate my system.

I'd like to see M/A-Com get a fair shake in this; they keep fighting me and others who have a desire to see this crazy scrambling thing turn out 'right'. I even flew to San Diego the last days in July to meet with Jim Bunker (see CSD for July 1st and 15th) and talk with people like Linkabit's **Doctor Mark Meddress**.

I figure it this way. M/A-Com has to either 'fish' or 'cut bait'. Sooner or later **one** of those cable programmers **is** going to balk, **go public**, and **tell it like they think it to be**. United came very close with their official engineering report which we drew from in our CSD/2 analysis for August 15th.

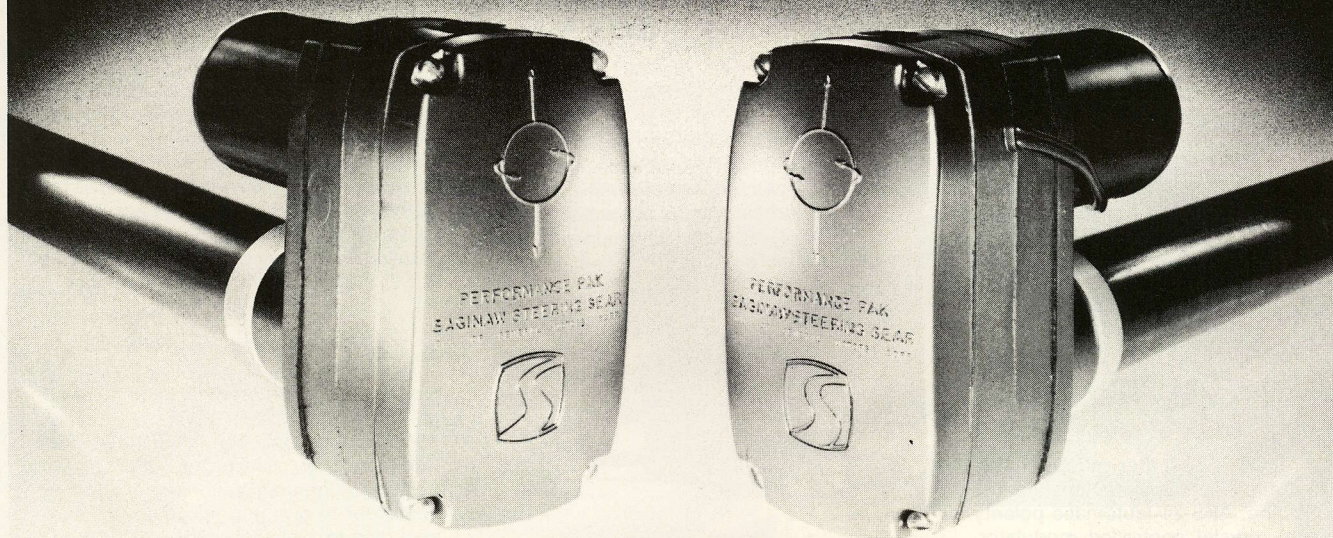
I think M/A-Com has one last chance to prove their system works. And to dispell the growing belief that not only is it politically a system which has problems, and economically a system which cannot fly, but on top of everything else it is a system with technical problems.

M/A-Com needs to allow a representative group from our industry **and cable** to conduct some totally unbiased testing. Here's where I would start:

- 1) Jim Bunker invited me to ride down to Puerto Rico with him in the 'corporate jet' to visit the plant where the VC2000E 'stand-alone' descramblers are to be (or are being) built. I accepted. I'd like to see a couple of other people go along. **I'll pick them.**
- 2) When we get there, I want to see no fewer than 2,500 VC2000E stand-alone descramblers in cartons or stacks; all built, all checked out, all ready to go. I'll crawl around on the cartons and select say 10 at random to take with us.
- 3) Then we'll let the M/A-Com corporate jet head west 600 miles and we'll set down on Provo. And we'll spend a couple of days there, opening up the ten units and conducting tests. To make the tests meaningful, M/A-Com will have arranged for HBO to feed us addressed, scrambled video via satellite. None of this 'open key' (i.e. **all** descramblers turn on) stuff. We'll give HBO the address codes **from the ten units** randomly selected and we'll have **Peter Sutro** or somebody like that standing by at the HBO Long Island uplink to insure that our ten randomly selected 'codes' for the ten units are added in with a universe of at least 50,000 address codes which **don't correspond** to any boxes **we have**.
- 4) Then we'll find out whether in an address universe of say 50,010 or so, we can get ten separate units to 'click on' when addressed. **We'll repeat the tests** a day later after adding a generous helping of subcarriers such as United has with WGN.

The whole sequence will be videotaped. The results will be available the day after the tests are completed and they will be released to **every trade publication** in and out of our field. Good, bad or indifferent. The last thing on my mind here is to have some sort of

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'journalist edge' on the rest, in this. Then as fast as we can get the videotape edited, we'll schedule a showing of the 'testing program' over a satellite available to everyone. I may even ask M/A-Com and HBO to arrange this uplink time on one of HBO's extra transponders.

If say 7 out of 10 work, I'll be pleased. If 8 or more work, M/A-Com should be happy. And we can then turn the page and forget all about the chapter we seem to be stuck on; i.e. is Videocipher flawed, or not???

And if it does not work? Well, like I noted at the beginning; M/A-Com made a mistake not sending their top line engineers to United Video for the testing we wrote about August 15th. The VC2000E is a brand new product and I'll give them that out of 2,500 units stacked up, us selecting ten at random might be a real challenge. But here we are, the home TVRO industry and there they are, the cable industry, getting ready to 'marry ourselves' to a system which at least has **the appearance** of being seriously flawed. Speaking for TVRO, we don't want and can ill afford going much further with a system that **might not** work. I'd hope that someplace out there in the cable industry, there was a cable engineer or programming CEO with the you-know-what to feel the same about the long-term profitability of his own business; and who would speak out to question that cable is doing the right thing here **also**.

This is a serious challenge to M/A-Com and I hope they take it for the purpose it is intended. Let me hear from you, Jim Bunker or Dick DiBona.

FAIR May Not Be Fair

As the arguments and players in the scrambling universe prolifer-

ate, some attention is being focused on 'fair charges' for the descrambling equipment and the services themselves. There are at least some indications that HBO **may be willing** to 'negotiate' their announced \$12.95 per month charges although to date they have stayed clear of talking with SPACE about such reductions.

Let's analyze what the hardware and software really cost and who pays the price. The hardware first.

A) Recently, in CSD (see CSD/2 for July 15th) M/A-Com's **Jim Bunker** said "**I think for all of us, the dealer, the distributor, and the original equipment supplier, the profits are very slim or narrow; perhaps 10% each . . .**".

B) He repeated the same statement on Boresight for July 25th. But in the Boresight report, we included a 'knee-jerk' comment of Jim Bunker which never made print in CSD/2. It went like this.

'Jim, what is the incentive for a TVRO distributor or a TVRO dealer to sign up for descramblers at this particular point in time?'

And Bunker's response was:

"Faith and you've gotta believe . . ."

Our decision to delete "Faith and you gotta believe . . ." from the **text** of the CSD/2 written report was made because as we reviewed the videotaped interview, we felt Bunker was 'being cute.' That he was reacting to a touchy, emotional subject with an off-handed knee-jerk reaction.

Maybe not. Maybe "Faith and you gotta believe . . ." is what M/A-Com **really feels** they have going for them at the present moment.

Certainly it takes some faith to accept that a product which will cost you, the dealer, around \$357.50 (\$325 distributor plus 10%) can be

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But M/A-Com, through Jim Bunker, is also telling us that while a ten percent margin 'may not be much,' that they **also** are taking it through their shop at a 10% margin. He said:

"I think for all of us, the dealer, the distributor **and the original equipment supplier**, the profits are very slim or narrow; perhaps 10% each . . .".

Numbers. If M/A-Com is building stand alone descramblers and selling them for \$325 to distributors, **and they are working on 10%**, that means the stand alone units will cost them \$325 minus \$32.50 or \$292.50 each. I doubt that. I doubt that very much. I doubt it enough that I have commissioned a part by part costing study for the product. Shortly I expect to know **exactly how much it does cost them** in parts. For now, I am going to make the assumption that they are capable of being produced for a total cost of **\$162.50**. That's the top end of what a box that sells for \$325 ought to cost the OEM in this business.

If **M/A-Com is willing**, as Jim Bunker says, to produce the box and sell it for **10% over costs**, we would be buying this stand alone unit for around \$178.75 at the distributor level and \$196 at the dealer level.

Let's approach it another way.

If M/A-Com is willing to accept \$32.50 profit for each VC2000E that is sold to a distributor, and it costs them \$162.50 to produce and ship, then the distributor should be able to buy it at \$162.50 + \$32.50 or \$195.00. Now if the distributor makes 25% (we feel he is entitled to a larger margin because of the unproven service problems associated with the product), we have the VC2000E arriving at the dealer for \$195 + \$48.75 or \$243.75. With an established user price of \$395, **this allows the dealer to make \$151.25** for each unit sold. And that is a far cry from \$38.50.

A significant part of the M/A-Com problem rotates around the totally immature approach they have created to market the VC2000E.

It is adding considerable insult to injury when they **scare the crap** out of us with scrambling, **totally upset** our market with HBO guys running around yelling 'the sky is going dark, the sky is going dark' **and then expect us** to handle their descrambler boxes for \$38.50 'profit.' I don't mind being asked if I want to wear a blindfold for my execution but I will be damned if I am willing to load the bullets into the executioner's weapon at my own execution.

HBO has the same problem. Their \$12.95 announced fee is at best \$3.00 higher per month than their established cable affiliate pricing. First they scare us to death with scrambling, then they support cable operator efforts to do-us-in at the dealer level with exaggerated cable ads and announcements, and finally they charge us a fee for the blindfolds available at our own execution.

I have written recently, and CSD/2 has published, a considerable study relating to the problems HBO has with charging us a reasonable rate for home service. For those who missed it, it goes this way:

- 1) Cable has a bottom line in all of this; **to stop TVRO growth** in cabled communities. They will do anything they can to put us 'out of business' in areas where cable is available.
- 2) Right now, **today**, we are an attractive alternative to cable because we sell hardware that allows people to tune-in programs which cable subscribers pay fees for.
- 3) Cable want us to stop selling 'free' the program services they pay for, and must charge for at the consumer level.
- 4) Scrambling of all cable program feeds, and creating a system which would charge fees to home TVRO users, just as cable consumers now pay fees, is in the works.

For six years now we have said **"We are willing to pay for programming."** And we are, but the charges must be reasonable. \$12.95 is **not reasonable** if cable subscribers get the same (HBO) service for \$9.95 (or less). \$12.95 is also not reasonable if the typical cable operator is paying around \$4 for the same HBO service.

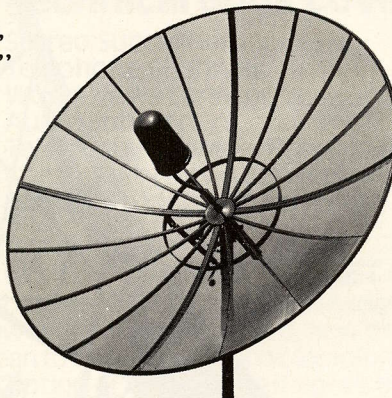
So we have **two illustrative pricing problems** here; the M/A-Com VC2000E is so badly overpriced that nobody can afford to handle

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it. It is possibly also overpriced vis-a-vis what it does or will do for the TVRO consumers. And we have an example program service which will cost more to receive through an overpriced descrambler than the cable viewer pays for cable delivery of the same service. Why would M/A-Com and HBO do this?

I believe there are two separate answers. M/A-Com has never been a very bright pricer of consumer-end products. They have no experience in **consumer** products and they continue to approach TVRO just as they do their military and big-time commercial contracts; they want to recover all of their R and D costs up front, in the first batch of products shipped. Jim Bunker, in CSD/2 for July 15th, said:

"If you follow the Boston Consulting Group's theory of market share, starting off at low pricing and gaining market share through the learning curve of start-up production, that is a strategy or theory that is prevalent in consumer electronics. M/A-Com tries not to follow that strategy..."

The opposite of starting off 'low' and building for volume is starting off 'high' and perhaps not building anything. M/A-Com appears to be in that position at the present time. And given their nearly 35 year corporate history, you may not change that philosophy. Ever.

HBO, on the other hand, is in a different position. They owe their cash-flow-blood to cable. If they do anything to upset cable, they could see a significant fall-off of their cable affiliates roster. **If cable wants TVRO 'out of business' where cable exists, then HBO wants that too.** By pricing at \$12.95, higher than HBO sells for anyplace within the USA today, HBO is helping their cable affiliates say to the would-be consumer **"Hey, buy one of those fool TVRO things if you wish; but HBO is priced (25-40%) lower on cable than via satellite and if economics is important to you, forget that TVRO thing and take the cable!"**

You see, HBO and cable now accept, very reluctantly, that TVRO

is here to stay. Some people in cable even look upon TVRO as ultimately a superior technology; one that will ultimately 'win.' These forward thinking cable types have everything they have worked so long and so hard for wrapped up in cable; and a bunch of disorganized guys running around the country pulling ten foot dish antennas behind their pick-up trucks are the cause of their concern. **'Cable,'** it is now accepted, **'was an interim technology.'** Satellite delivery seems like an **'ultimate'** technology. The trick, for cable and broadcast people, will be to slow down satellite growth **until** the broadcast and cable folks can re-position themselves financially and legally to take advantage of 'this ultimate technology.'

One very effective way to slow down our encroachment is to force us to become more expensive than cable and broadcast; for awhile. Until the current scrambling wars began, the only expense attached to TVRO was the hardware expense. And with Japan now playing in the hardware arena, there is no way that American broadcasters and cable operators can do anything to change the downward spiral of hardware costs. So what to do?

Create a new expense; a software expense. **Start charging for the programs.** On the surface that seems like a good way for cable people to make some extra bucks. Actually, it is a better way (if they can pull it off) to arrest our growth **until** they figure out how to totally control our technology. If they don't take steps to do this? M/A-Com's Frank Drendel:

"If (cable owners/operators) don't start today and be pro-active in this effort (to stop TVRO growth), we will never catch up. There will be three million dish owning consumers out there (by summer of '86) and they will have the political lobby to say 'We want it our way'."

Recently on Boresight, I watched a report which suggested that TVRO dealers and consumers 'band together' to let Time, Inc. know

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that we do not approve of the HBO pricing approach to home TVROs. **It was suggested** that people cancel their subscriptions to Sports Illustrated, Time and other publications; **demanding a refund** for their unused portions and writing angry letters to Time, Inc. (the corporation) protesting. A group in Virginia is distributing a 'dealer kit' designed to provide examples of such letters. Fifty thousand such letters would certainly get their attention. 500 will not.

The question becomes how do you **force** M/A-Com and HBO (as two early examples; more will come, surely) to reconsider their predatory pricing approaches? Many (many) TVRO dealers have suggested or urged that dealers **stop handling** M/A-Com products; including Prodelin antennas, for example. A list of products using M/A-Com **component parts** (out of their largest and most profitable division; the division which creates raw parts for the electronics industry) is being prepared by another group and from that parts list will come a list of **finished products** which the group will urge people not to buy **because they contain M/A-Com parts**. That would have an impact provided the firms using those parts were told, and understood, that there was an active 'consumer boycott' of their widgets and gadgets **because they were buying M/A-Com component parts**. Another group is preparing a list of TV stations that have bought and are using M/A-Com broadcast electronics. The plan here is to picket these TV stations to draw attention to their use of electronics from a firm so heavily involved in the scrambling area. **TV stations are very easily intimidated** and if they found pickets at their front door, **and competitive TV station camera crews interviewing those pickets**, chances are that TV station would not be buying new M/A-Com broadcast equipment for a year or two.

The messages here are simply that you **battle economics with economics**; if M/A-Com's pricing for the scrambling equipment is unfair to TVRO consumers, then slowing down M/A-Com sales will have a negative effect on their growth. If HBO pricing is too high and that sets a dangerous example for other cable programmers, respond by actively fighting to have Time, Inc. income reduced; **stop buying their products**.

All of this sounds very 'activist'; very much 'getting involved' in a complicated program that on the surface seems very unrelated to the simplistic selling and installing of TVROs. Alas, our life as apostles of 'the ultimate technology,' satellite service, does include a few crosses which we must bear if we are to co-exist with the existing 'interim technologies.' The focus of our business venture continues to change as the battle to control our destiny shifts into a higher gear. TVRO life **two years ago** was far simpler of course; TVRO life **two years hence** will be far more complicated. You are a passenger on a train taking us all to the 'ultimate destination' and because there are only a limited number of seats, not everyone can ride this train. Welcome aboard.

STILL Talking With M/A-Com

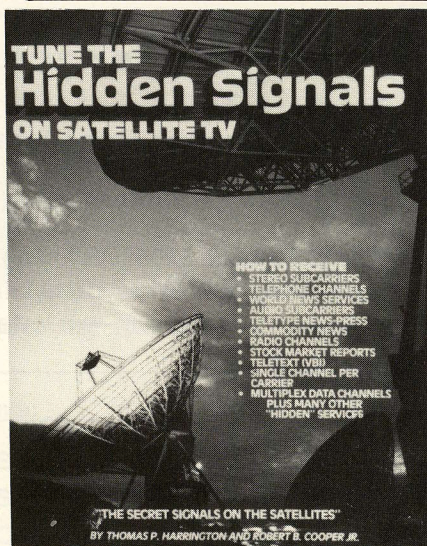
CSD, truly, spent the better part of the spring taking corporate M/A-Com to the carpet for being perceived as 'the guys in the black hats' in the scrambling debacle. Then in our July 1st issue we presented part one of a two-part interview with **James F. Bunker** of M/A-Com. At the same time, on Boresight during July, we released a three-part dialogue with Bunker. As noted in CSD for July 1st, the scrambling battle had gotten out of hand and there is a time to come to the 'peace table' **and talk**.

I am still talking with M/A-Com. Early in August I flew to San Diego to visit the M/A-Com LinkAbit facility where I had the opportunity to see software (computer instructions) being debugged for client HBO and to talk with the people responsible for the Videocipher project at length. Some quick observations:

- 1) **The boycott** of M/A-Com equipment, widely talked about in **some** of the media, is **not working**. I satisfied myself that M/A-Com TVRO sales are up, that in spite of some distributors dropping the line, the volume of TVRO hardware going out with the M/A-Com label on it has never been higher.
- 2) **M/A-Com perceives** a battle coming between itself and Scientific-Atlanta over the ultimate 'scrambling standard' in the USA. M/A-Com has enlisted some significant corporate strength to their side; RCA for example. As an aside, we should expect

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COOP/ continued from page 73

RCA to become the first major supplier of television receivers to offer TVRO systems **and TV sets** with TVRO tuning **built-in**. When? Before mid-1986, and first in their top-of-the-line consumer systems.

- 3) Significant **downsizing breakthroughs** are coming, perhaps sooner than was anticipated, with the basic descrambler hardware.
- 4) The first small production of standalone descramblers (VC2000E) is nearly completed, at La Jolla, and there is a technology 'transfer' now underway to bring the production to the M/A-Com plant in Puerto Rico. Volume descramblers? When there are **volume orders**, but not sooner than late this year in any event.
- 5) The much touted 'master computer control center' will not turn on from Long Island, after all; a new facility under construction at the LinkAbit **La Jolla plant** will handle this chore initially, for HBO, and then **if** there are enough programming services scrambling, using the Videocipher system, a redundant uplink control center will go into Long Island.

In other words, it is business as usual at M/A-Com and while the attitude of the TVRO industry, towards M/A-Com, may not seem good, none of this is presently worrying the firm. They fully anticipate winning the present battles, and the war, even if our own assessments of their chances of success are not as optimistic.

RCA Pushes Videocipher

RCA, 'The' Radio Corporation of America, has joined the Videocipher circle of friends by coming out strongly against something called **B-Mac**. As noted elsewhere here, there is something of an underground battle underway between M/A-Com's Videocipher supporters, and, the supporters of the Scientific-Atlanta B-Mac system. RCA has sided with Videocipher.

In a week-long series of demonstrations and dialogues hosted by RCA in Princeton (NJ), HBO and M/A-Com joined with RCA to explain why the NTSC television system is the system of the future for North America. On the surface, that may not seem like it has much to do with scrambling.

The English created B-Mac system, adopted by S/A, is more than simply a scrambling system. In fact, the scrambling part of it is secondary; scrambling just sort of happens because B-Mac is an (almost) entirely new way to transmit television. It is so different from NTSC that when you attempt to view B-Mac on an NTSC television set, the picture comes out 'scrambled.' To unscramble B-Mac, you need a B-Mac television set or monitor.

Therefore, **B-Mac is a challenge to NTSC**; 'our' basic television system. In the most ambitious scenario that might be painted, everyone in North America would adopt B-Mac and gradually discard NTSC. That would mean that ultimately every television set in North America now operating would be outdated. Everyone would buy a new television set, or, at least a B-Mac to NTSC converter. One would think that RCA would like that since they could start selling television sets to everyone, all over again. Wrong.

RCA, more than any other company, **created NTSC**. They created the original black and white standards for North America and in the late 40's and early 50's they created the color system we now call NTSC. RCA doesn't want the system changed. **Neither does M/A-Com** since Videocipher is an NTSC system. HBO? One can only conjecture why HBO should join M/A-Com and RCA in this effort 'to save NTSC.'

So RCA conducted these tests and explained to everyone that the 'advantages of B-Mac are really not advantages at all.' You see, one of the reasons there is a B-Mac is that the British (and now most of Europe) really believe that the world knows significantly more about creating high quality color and high definition video today, in 1985, than was known back 30 years ago when NTSC and the European PAL formats were created. The Europeans believe that the time has come to update the 'standards' of television transmission and now as the world is moving to satellite delivered 'DBS' is an excellent (and perhaps the last) opportunity to do so.

The supporters of B-Mac disagree. They claim that B-Mac means

far better color, an end to herringbone patterns in the color, beat patterns caused by the audio subcarrier and far better 'edge definition.' RCA counters with 'B-NTSC,' a new and improved NTSC which they say could be in mass production shortly.

RCA said they held this demonstration to try to establish a 'satellite transmission standard' before they launch their first 45 watt per transponder Ku band satellite in December. RCA may be talking with HBO about using some of the Ku bird transponders for delivery of programming to individual homes. HBO's scrambling technology falls in the B-NTSC family because B-NTSC does things like transmitting the audio and data in the horizontal interval thereby eliminating separate subcarriers. B-NTSC also transmits the horizontal and vertical timing signals in digital format. The bottom line in all of this is that in B-NTSC the picture is 100% picture; whereas in standard NTSC, 30% of the picture 'bandwidth' is used to transmit vertical, horizontal and color information during the so-called 'blacker-than-black' region.

All of this makes people at M/A-Com and HBO smile alot because to them RCA just became a powerful ally against any possible use of another scrambling technique such as B-Mac. The entire RCA meeting was run as a high-tech media event and RCA was in control from the opening gun. Coming into the demonstration, most engineers would have instantly voted that based upon what they knew and had read, **B-Mac was the television standard of the future.** After the demonstration? RCA seemed about equal with B-Mac and that made RCA and their 'small-time' supporters HBO and M/A-Com very pleased.

LAWsuits

Part of the unfortunate 'maturing process' of any young industry, such as our own, is that sooner or later people will get crossways to one another and there will be disagreements; business disagreements. When the parties involved cannot find a solution to such

disagreements which satisfies all participants, a lawsuit often follows. There is a rash of lawsuits underway at the present time.

Remember **SFPC**; Satellite Financial Planning Corporation? Well, SFPC and the Wilmington, Delaware bank which provided the funds for SFPC to distribute are into a dilly of a lawsuit; SFPC is accusing the Bank of ten different 'counts' and they are asking **\$300,000,000** in damages. That's about one-third of our entire industry's business volume during the year that SFPC was distributing dollars.

Not all of the lawsuits are as large as this one, of course. A dealer in New York state is being sued by a customer because the customer does not like the quality of the reception. The system installed apparently has some noisy transponders on F3R and some also-not-so good on F4. The customer says 'every channel should be perfect' and the customer has gone to the New York Attorney General to file a consumer suit.

A middle range suit has been brought by the stockholders of now defunct **National Microtech** against M/A-Com; a mere **\$30,000,000** or so is being asked in damages in this one. The stockholders in NM are charging that M/A-Com 'conspired' to put the company out of business by shipping NM 'defective merchandise' and by acting to take over control of the NM Board of Directors.

These three suits are examples; a full and complete list would fill several pages here. But they all have several things in common:

- A) Each suit sooner or later will seek to find some 'expert witnesses'; people from within our industry who can testify, in court or through deposition, about some particular segment of the suit. There is a sudden 'demand' in our industry for 'expert witnesses' and if you qualify, you could be raking in upwards of \$500 per day plus expenses for making your 'expertise' available.

In each of the three suits just listed, I have been asked to be an expert witness. In two of these cases, I have been asked to be an 'expert witness' by **both sides!** That's part of the problem with becom-

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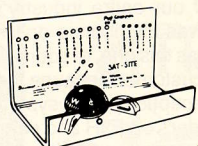
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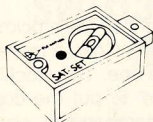
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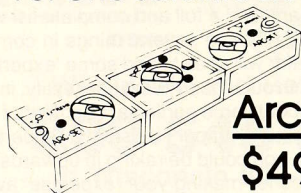
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ing 'an expert witness for hire,' you have to 'choose sides' and with so much inbreeding in our small industry you obviously will end up making one side angry no matter which way you go. To date I have spent an accumulated week's worth of time meeting all over the country with attorneys and others involved in several of the cases now underway, just learning more about the 'deposition' and 'expert witness' process. I recently came to a conclusion concerning my own participation as an 'expert witness.'

In the case of the New York dealer, where the customer is not a direct part of our industry, I would have no trouble preparing testimony to back up the dealer position. However, I would accept **no pay** for this task.

In the other two cases, where we have SFPC suing a bank for \$300M and the former stockholders of National Microtech suing M/A-Com for \$30M (+), I would abstain from any direct participation as an 'expert witness.' That will probably not leave me out of the courtroom proceedings, however, since in at least the SFPC case, I was present during a number of 'private conversations' between the bank's officials and SFPC officials and my presence was the only 'non-aligned' presence. When the bank president died, only months after the SFPC program got started, and substitute bank officials attempted to 'interface' with SFPC people, the difficulties began. Thus I find myself in the unusual position of being a **direct witness** to the events which are in contention in the lawsuit.

The SFPC and NM lawsuits have even bigger numbers than those recited, at stake. SFPC charges the Delaware bank with violation of several banking statutes. If they could prove these violations for all ten counts in the suit, the damages automatically multiply by a factor of ten (that's the law). So potentially, the bank faces fines and damages totaling **\$3,000,000,000** (\$3B). That gives one pause to ponder how long this industry would have to be around to create **that kind of 'cash-flow-profit.'** In the NM case, the original suit brought by the last stockholders of National Microtech has been subsequently 'joined' by a second suit, filed by a pair of original stockholders of National Microtech. They are **also asking** more than \$30M from M/A-Com. Neither the SFPC suit nor the NM suit are likely to find room on a busy court calendar much before mid-'86.

The bottom line in all of this is, as always, money. 'Suppliers' are being charged with various mid-deeds which the allegers claim resulted in their going out of business. The defendants in each case will need to prove that the companys would have gone out of business on their own because their marketing and management were 'flawed' by the way they were operating their businesses. If these suits, and several others in similar phases of 'discovery,' do come to court, it will mark a new 'era of maturity' for the TVRO industry. Those in business today, holding on or doing better than holding on, should learn all they can about this type of suit because the odds are good they too will be involved in similar suits as the industry continues to 'mature.'

CORRECTING A Misimpression

Within "Coop's Comments" for last January, I editorialized about the subject of discount pricing. Using a pair of publications not in the TVRO field (**Video Store**, and, **Cable Television Business**) I drew some personal observations about the subject of discounting and the status of our own industry's dealers. In particular, I cited the operation of Long's Electronics as an example of an operation which has caused dozens (indeed, perhaps hundreds) of dealers to write to me or buttonhole me at trade shows. Reciting an editorial appearing in Video Store Magazine that dealt with discounters, I pointed out that operations such as Long's **"are not in the same business you are in..."**. I also suggested to dealers that they **"...concentrate on selling service, knowledge and expertise"** rather than being concerned about competing with a volume distributor who moves 1,000 of an item each time dealers sell one. The Video Store editorial told its reader-dealers essentially the same thing; **if you try to compete on price alone**, the larger firms that move huge amounts of inventory will out-price you at every turn.

It is my impression that Jimmy Long has read this editorial of last January as an 'attack' on he and his operation. And I wanted to set the record straight on that issue.

First of all, it was **an editorial** just as my 'comments' have been editorial or viewpoint from the day CSD began. Those who have been



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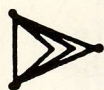
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readers of CSD very long are well aware that I have strong opinions on many matters and I could probably list a dozen occasions through the years where my editorial comments have been painfully 'correct.'

My editorial comments focused not on Long nor Jimmy Long's business but rather on the dealer feedback I was receiving concerning **the inability of the dealer to compete** with a volume merchandiser such as Long's. The Jimmy Long operation is apparently the largest volume house in TVRO and their pricing scheme has always concentrated on reducing prices through volume marketing. And frankly, I was tiring of having to 'defend' the position of Long's in the marketplace to every dealer who felt he could not compete with Long's pricing. When I read the editorial in Video Store, I immediately saw another editor who was coming to editorial-grips with the same problem. His wisdom was excellent; he pointed out that if the only thing you, as a dealer, have to sell is price, you are doomed. He encouraged his readers to sharpen their own marketing skills by concentrating on expertise, service, and proper product selection. I echoed his sentiments from the retail video world by transferring them to the TVRO world.

Jimmy Long apparently felt personally attacked by my use of his firm as an example of a volume merchandising house. And that is the misimpression I seek to clear up here.

I function when preparing my "Comment" section by drawing from personal observations (such as a visit to **Anderson Scientific**; see CSD for July 01), by reading my mail carefully (see **'DX Advantage'**; CSD for August 01) and by doing analysis of trends or activities (see **Reaching Consumers**; CSD for August 01). These are all clearly separate from a detailed report concerning some personality or issue of our day which appears in CSD as a 'feature' (see **M/A-Com's Bunker Talks Back**; July 01).

My January editorial was titled 'Other Publications Suggest' and it came from the 'reading my mail carefully' category of "Comments." After reading the Video Store editorial, I located a relatively heavy inactive file folder containing several years worth of letters titled 'Dealers vs. Long's Electronics.' I reread each of the dozens of letters and instantly saw what I had remembered; dealers who had fallen into the 'price is all I have to sell' syndrome. The marriage of the two was clear.

Letters 'complaining' about Long's pricing tactics dated back several years. There were trends; more letters late in 1984, than previously. I interpreted that to mean we had more new dealers who didn't understand what TVRO selling was all about, and, an increasing market share for Long's. Numerous letters dealt with dealer charges that Long's "sells to everyone" and a couple included sworn statements from dealers and consumers who told how they had been able to buy 'as dealers' without proper dealer certification. I **chose to ignore that issue** in my January editorial since I had no intention of attacking Jimmy Long. I felt that subject, if addressed, deserved at least an opportunity for Jimmy to respond to the charges **before** they made print and even as I write this I am not so certain this part of the issue is anything more than 'sour grapes' from dealers who can't focus away from the pricing problem.

During the last year, the growth and importance of Long's Electronics in the marketplace has increased significantly. Bob Dushane recently said that he is shipping 4,000 of his TVRO receivers a month to Long's Electronics. While Janeil receivers are a significant part of the Long's product mix, they hardly make it all up. The volume for Long's this year should be very close to the volume of a top selling OEM; perhaps as much as \$65M. Recently Long's has instituted elaborate dealer training seminars and I am told their service and repair facility is the best in the business. Bar none.

None of this sounds like a firm that may have been maligned by one of my editorials. When I heard that Jimmy Long was upset with the January editorial, I suggested that he go back and re-read it since there was no intention to malign his operation. When you are the biggest guy on the block, and you have hundreds or thousands of little kids on the same block who envy your size and stature, it is inevitable that there will be those who resent your acclaim.

The growth and maturity of Long's during the past couple of years may well be one of the best kept 'secrets' in TVRO. I would like the opportunity to visit Jimmy Long, tour the facility, and with still and video cameras in tow, analyze what I see and learn, in some detail.

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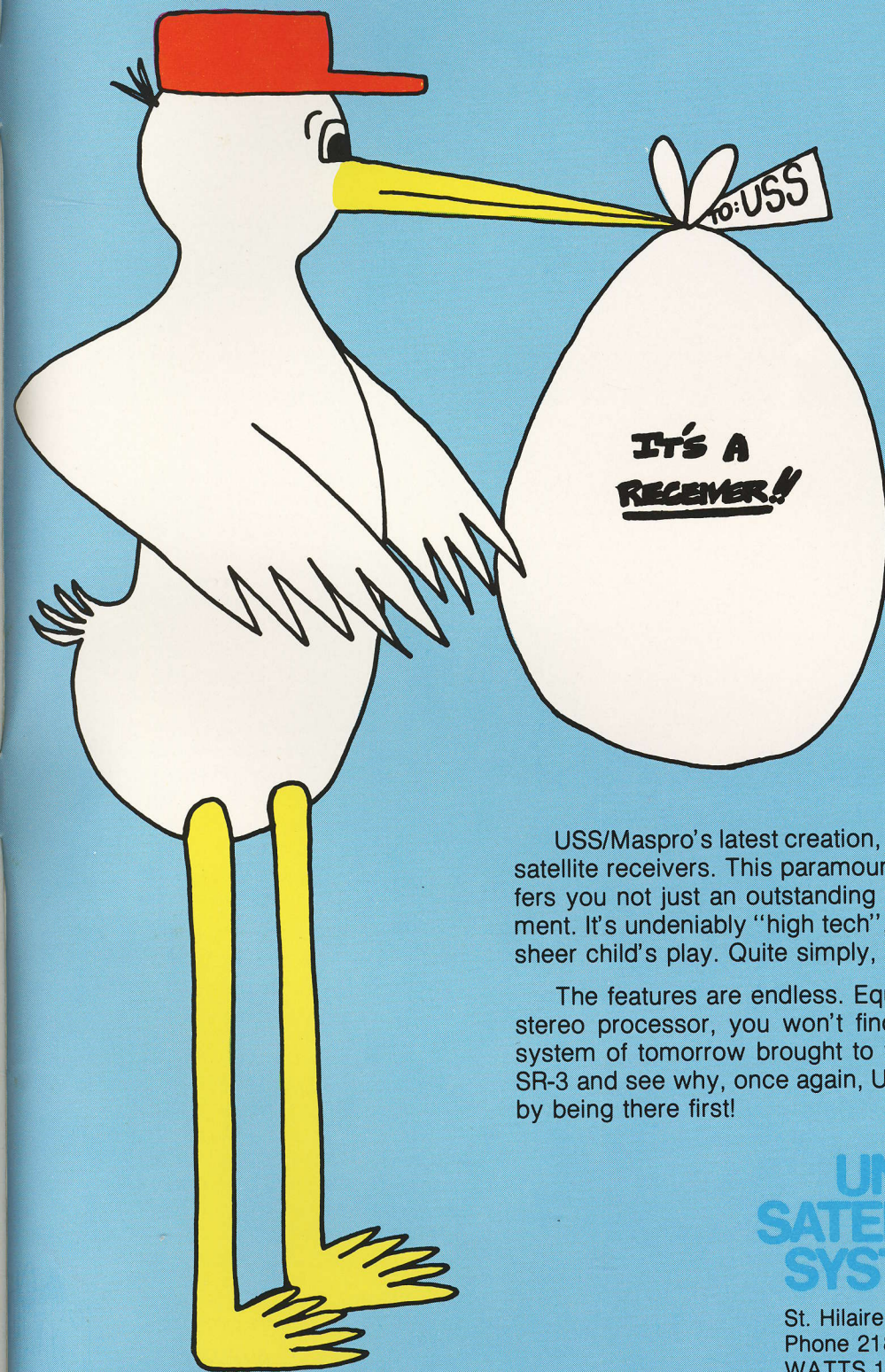
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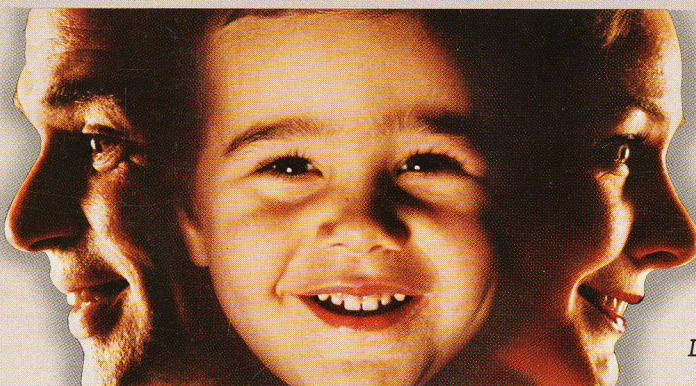
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